

Engineering Library

SEP 10 1923

AMERICAN ARTISAN and Hardware Record

VOL. 86. No. 10. 620 SOUTH MICHIGAN AVENUE, CHICAGO, SEPTEMBER 8, 1923. \$2.00 Per Year.

WALES FURNACE FAN

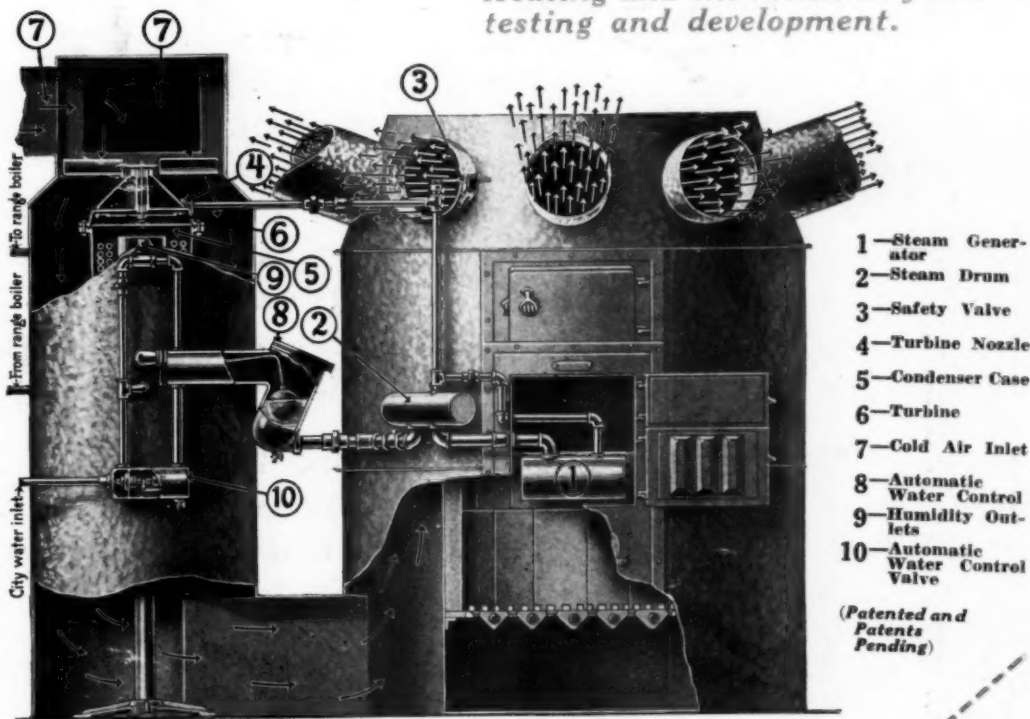
Automatic and Positive Air Circulation

The Wales Fan is the biggest advancement in modern Warm Air Heating and the result of years of testing and development.

IT is automatically operated by steam generated within the firepot. No electrical connections required.

THE Furnace Fan forces a large volume of warm, **MOIST** air through every register.

IT also supplies an abundance of **HOT WATER** for domestic purposes, no water-back necessary.



The Wales Furnace Fan Doubles the Heating Capacity of any Furnace

**WRITE NOW—TODAY—FOR CIRCULARS,
DETAILED AGENCY INFORMATION
AND DISCOUNTS**

FURNACE FAN CORPORATION

Dowagiac

Mich.

TEAR THIS OUT
Furnace Fan Corporation, Dowagiac, Mich.
Please send us complete information regarding the
Wales Furnace Fan.
Name
Address
I am a ☐ Hardware
☐ Furnace Dealer.

Two In A Thousand

IT is estimated that there are twenty-five thousand furnace installers in this country. Half of these, I am told, make a fair living out of their business. One third fail. And less than a thousand of them make a real profit on their investment.

I'm Talking to That Thousand

AND among that thousand I'm really only talking to those who are now selling above one hundred furnaces a year. And out of that thousand I can only take on about fifty, because five thousand furnaces per year is all I can sell on the plan that I have proven out. That plan involves no risk on your part—if you are in the class of the one thousand. And if you are, I can actually give you more profit than you would ordinarily make.

I have been making good furnaces for thirty odd years and that is the kind of furnace that I am selling now—nothing cheap about it except my price.

If You Want To Be One of the 50

WRITE for information to Box A, care of AMERICAN ARTISAN, 620 So. Michigan Avenue, Chicago, Illinois. The Editor knows me and this ad would not appear in his publication if he did not know that my proposition is absolutely straight.

Founded 1880 by Daniel Stern

Thoroughly Covers
the Hardware, Stove,
Sheet Metal, and
Warm Air Heating and
Ventilating Interests

AMERICAN ARTISAN and Hardware Record

Address all communications
and remittances to
AMERICAN ARTISAN
AND
HARDWARE RECORD
620 South Michigan Avenue
CHICAGO, ILLINOIS

PUBLISHED EVERY SATURDAY BY THE ESTATE OF DANIEL STERN

Eastern Representatives: C. C. Blodgett and W. C. White, 1478 Broadway, New York City

Yearly Subscription Price: United States \$2.00: Canada \$3.00: Foreign \$4.00

Entered as Second-Class Matter June 25, 1885, at the Post Office at Chicago, Illinois, under Act of March 3rd, 1879

Copyright, 1923, by the Estate of Daniel Stern

VOL. 86. No. 10.

CHICAGO, SEPTEMBER 8, 1923.

\$2.00 Per Year.

WE CAN LEARN SOMETHING VALUABLE FROM THE BANKER AND THE UNION LABORER.

A man who at one time was prominent as a salesman of sheet metal shop supplies, but now in more "dignified" line, as he puts it, made the statement at a recent meeting of the United Sheet Metal Contractors of Chicago, that if any Chicago banker turned down a certain financing proposition it would be a safe guess that no one in the entire banking fraternity of Chicago would take it on.

They have an organization in Chicago among the bankers, called the Chicago Clearing House Association, and unless a bank is a member it is not considered a very safe place in which to deposit money—at least, not by the people who stop to think.

Organization along proper lines and with proper safeguards for the stabilizing of their business has done more to put the Chicago banks on a safe footing for the depositors than all the state and federal banking laws put together.

It is all very well to talk about the crooked business agents of labor unions—and there are altogether too many crooked business agents—but the fact remains that these same business agents derive their power from the fact that behind them stand organized bodies of men engaged in certain specific trades, skilled as well as unskilled.

Even the street sweepers in Chicago have a union, and certainly no one will try to maintain that it requires any skill to manipulate a broom.

The window cleaners, and the janitors, and the scrub ladies have unions and are working under better conditions and at better pay than before they were organized.

There are in Chicago, so far as we know,

only two large groups of men which are not organized.

One is the dear general public—the so-called consumer—and nobody pays a great deal of attention to what Mrs. Smith or Mr. Jones says. They have to buy what the grocer provides and pay what he demands, or else go hungry.

The other group is composed of the 1500 odd sheet metal contractors who for some reason feel themselves so strong and so unaffected by competition and doing business under such satisfactory conditions, that they cannot see the need for an organization.

To be sure, there is an association of the larger contractors—engaged principally in large, new construction work—and this association has done much to improve some of the bad conditions in the trade, and is still doing so.

But the great majority—95 per cent to be specific—of the Chicago sheet metal contractors are either so well satisfied with the conditions under which they operate, or else they are so spineless that they are not even willing to make an effort to improve their chances for a better and more profitable business by joining either the Chicago Sheet Metal Contractors' Association—the organization named above—or the new association which is now being formed under the name of the United Sheet Metal Contractors of Chicago.

The men who are spending their time, energy and money to promote and maintain these two organizations are far-sighted and broad-minded, but all of their efforts will be in vain, unless those for whom these efforts are expended in large part wake up and do a little to help themselves.

Random Notes and Sketches.

By Sidney Arnold

What a man accumulates, for himself alone, is never really his. He may revel in the delusion of ownership, concentrate his powers on hoarding gold, at the expense of a shriveled soul and hardened heart, but he will never actually possess.

What one gives and does for others—Ah, that is another story. It is his from the moment of its giving, his throughout the whole journey of life, and ultimately becomes a passport to happiness.

"I will study the ideals of my own soul."

"I will faithfully execute the designs therein."

"I will make true service my gospel."

"I will give the world the best I possess."

"I will help the other fellow."

"I will begin now."

* * *

Here are a few suggestions for the fellows who will have charge of the entertainment and sports at the outings and picnics which are to be held next summer, or this fall for that matter.

Instead of the ordinary race for fat men let them try to thread a



needle while doing fifty yards in a gunny sack, at the same time holding a raw egg in their mouth.

For the ordinary "gink" this improvement should be a good one: Place several saw bucks or "horses" over the running course and have the contestants carry an open bottle of pop and a glass on a tray. The winner to be the one who can fill the glass and not spill any while taking the hurdles.

This one should appeal to "Bill" Laffin or "Newf" Pierson: A married couple's race, the hubby hooking up wifie's dress while she is putting on a touch of cheek freshening and a bit of red to her lips,



all while doing the fifty yards in three flat or more.

And for the dudes we have a good one. Race to be one hundred yards, each contestant being required to tie a bow tie, time not to be more than twenty seconds for the distance,

The fellows who "roll their own" might have a race, too; distance, one hundred yards, hurdles. Each contestant being equipped with a bag of tobacco, a paper and a parlor match, the winner being the one who succeeds in completing the job, time limit being twenty-five seconds.

* * *

Nobody likes a grumbler!

His fellow workers don't like him and his boss doesn't like him.

Sometimes I think he hates himself.

At any rate, he's his own worst enemy, for he is doing the very thing to hurt him in his position and unfit him for his work.

A man can't think dark, gloomy thoughts and continually grumble, growl and knock and keep his mind on his work.

Everybody has so much time and energy to put into the day's work.

He can either use this time and energy in the faithful accomplishment of his task or waste it in pessimistic growling.

One thing is dead certain—the cheerful, willing fellow who loves

his work and has a smile for his fellow workers—will win promotion, while the grumbler remains where he belongs—at the bottom of the ladder.—Norman Burdick.

* * *

A friend of Bill Laffin, the new Chicago manager of Tuttle & Bailey, was calling on a young lady whose little sister delivered the following message:

"S-s-s-sister s-s-s-says t-t-t-tell you s-s-s-she w-w-will b-b-be r-r-r-right d-d-down and f-f-for y-y-you n-n-not t-t-to s-s-s-sit in th-th-th-that ch-ch-ch-chair. It's j-j-just b-b-b-been p-p-p-painted!"

The trouble was that Bill's friend had just sat down in that chair. He did not take the young lady riding that evening.

* * *

Harry M. Snow, of the Furnace Fan Corporation, likes to attend conventions of furnace and sheet metal men and he usually has a good fund of stories. Here is one of his latest:

Lawyer: "You may tell the court what reasons, if any, your husband had for beating you up in such a manner."

Mrs. McGarrity: "Sure, an' didn't he know that Mrs. Gafferty had that very mornin' been after borrowin' me rollin'-pin and all of me irons?"

* * *

"Jumping at conclusions is not a very safe thing to do," said Bill Lamneck to me the other evening when I met him in the lobby of one of the Chicago hotels, Mike Armstrong being with him, and he illustrated his statement by the following story:

"Sure," wailed Mrs. Casey over the backyard fence, "an' 'tis me husband was nearly poisoned last night when the bedroom ceilin' was after collapsin'."

"'Tis foolish ye are, entirely, Mrs. Casey," remarked Mrs. Houlahan. "Poisoned, indeed! Is it infernal injuries ye mean?"

"Infernal injuries, me eye, Mrs. Houlahan! 'Tis poisoned I mean. Terence always sleeps wit' his mouth open."

Problems of Theatre Ventilation Discussed by E. P. Heckel Before Illinois Chapter.

Heating and Ventilating Engineers Hear Interesting Paper on Cooling and Ventilation of Theatres.

E. P. HENCKEL, of the Carrier Engineering Corporation, discussed the cooling and ventilating of theatres at a recent meeting of the Illinois Chapter of the American Society of Heating and Ventilating Engineers, his paper being in part as follows:

Ventilation of the theatre, or any other enclosure, is in itself a comparatively simple problem, if you consider ventilation merely a matter of displacing theatre air with a large or small volume of outside air by mechanical means. The cooling of a theatre is also rather simple when incorporated with ventilation and when theatre temperatures (dry-bulb alone) are considered without respect to relative humidities or resultant wet-bulb temperatures, or when the economical operation of the theatre refrigeration and ventilation system is considered a matter of no real importance.

Broadly speaking, what is to be considered when we think of theatre ventilation and cooling? That subject in itself represents money spent for mechanical equipment for the assurance of the comfort of the patrons while in the theatre. I believe we should consider of paramount importance all of the following factors, any two of which, if omitted in such consideration, would not permit maximum comfort conditions commensurate with economy in the operation of such equipment. We like to think of theatre ventilation and cooling as comprising the following:

1. Maintaining dry-bulb temperatures in the theatre with some respect to outdoor temperatures.
2. Maintaining a uniform wet-bulb temperature with respect to the dry-bulb temperature.
3. Providing good air circulation, or air movement.
4. Providing proper air distribution to promote uniformity of air

delivery without objectionable drafts and without subjecting the patrons to either warm or cold saturated air, to their discomfort.

5. Maintaining purity of air in circulation.

Objections to Upward Ventilation Through Mushrooms.

Some objectionable features of the conventional method of air distribution, namely, the mushroom method, might be enumerated as follows:

1. A system designed to deliver air directly underneath the seats from the cooling apparatus, whether it be from a spray type dehumidifier or bunker coils, without a recirculating air mixture or means of reheating, proves objectionable in that saturated air delivered under the seats with temperatures that may range anywhere from 50 to 65 degrees during the refrigeration period.

2. Difficulty is involved in getting a uniform distribution of air delivery since low duct velocities are necessary in the supply and practically the only means for regulation or varying the quantity discharge by the different mushrooms is by the adjustment of the mushrooms themselves. In adjusting the mushrooms, varying the sizes of discharge openings, varies the velocities from the various mushrooms. Even though the volume of air may be varied, the results are obviously uncertain.

3. The mushroom delivery method has one objectionable feature which it may be considered important to eliminate. I question if any of us would refuse to recognize the fact that air delivered directly on the floor level in a horizontal plane, disturbs the floor dust and keeps it in more or less constant circulation.

4. With the mushroom delivery method, the temperature and humidity regulation is not as easily obtain-

able and positive as we believe it should be.

Air conditioning in the past has been directed largely to industrial lines where the requirements for definite and uniform temperature and humidity conditions are infinitely more exacting than with theatre cooling and ventilation, although relatively not more important. Why not profit from that experience? I believe I am correct in saying that in no case do we deliver air at floor level.

Mushroom Exhaustion Advocated.

Of extreme importance, as I see it, is air distribution, but it is also necessary that the design of the apparatus be of proper proportion for specific temperatures and humidities with a simple yet positive means for control of both. I therefore prefer, wherever practical, the downward method of air delivery which reverses the conventional method of mushroom delivery to the method of mushroom exhaustion. The principal advantages of the overhead method, I believe, can be enumerated as follows:

1. Uniformity in air distribution as well as distribution of temperature and humidity, obviating objectionable drafts, which by the overhead method, I believe, is more easily obtained.

2. The downward flow of air has the advantage of permitting the cool air delivered to be tempered before it reaches the breathing zone, and this air comes direct to the occupants.

3. It permits of flexibility in operation, whether one or more units are used, by splitting up the theatre into separate air delivery zones, as well as separate air exhaust zones, each zone being taken care of independent of the other.

4. If the rear of the house is unoccupied, the apparatus for that particular portion need not be in operation. This applies to any other portion of the house as well.

5. It permits closer regulation of temperatures and humidities, as the automatic regulators are then placed in the exhaust or return air duct which air temperatures will give the

average breathing zone conditions which, after all, is what we are interested in.

A Case in Point.

Let us assume that we want to hold the theatre conditions at 80 degrees maximum temperature when outside is at a maximum of 95 degrees. The theatre humidity conditions to be held at 55 per cent relative humidity, with wet-bulb temperatures does not exceed 68 degrees. This means a moisture content in theatre air of not more than 6.93 grams per cubic foot, and which determines the dewpoint temperature of room air to be 62 degrees. This fixes one condition and consideration that cannot be changed, and that is—regardless of the volume of air passed through the cooling apparatus and regardless of the type of cooling apparatus, that air passed through the cooling equipment must be cooled to at least a temperature of 62 degrees before it is delivered to the theatre. Why? Because it is necessary, first, to fix the moisture content of the air so that when this air heats up to 80 degrees (the theatre temperature selected), the moisture contained by the air will be 55 per cent of the amount that air at 80 degrees could hold, if saturated with moisture. Air at 80 degrees if saturated, would hold 10.934 grams per cubic foot. Since we want 55 per cent relative humidity, the actual moisture contained in the 80 degrees air must be 55 per cent of 10.934 or 6.02 grams. To obtain this condition necessitates cooling the air and condensing out the excessive moisture contained in the entering air, down to 62 degrees, at which saturated temperature, the air will hold only the requisite moisture necessary.

We are considering a 2,000-seat house. How much air is to be delivered? How much is to be cooled? We know that regardless of what volume we select, we must cool the air passing through the dehumidifier to at least 62 degrees. Some say 25 c.f.m. per occupant, all from outdoors. This would mean 50,000 c.f.m. cooled to 62 degrees. What does this mean in refrigeration load?

What is the B. t. u. load to be absorbed from this air that is being cooled? What will be the resultant theatre conditions?

Heat to be absorbed in the theatre by the delivered air is 10,000 B. t. u. per minute with a full house (5 B. t. u. per minute per person). Therefore—

$$10,000 \text{ B. t. u.} \times 56 \div 50,000 \text{ c.f.m.}$$

results in a rise in temperature to the delivered air of 11.2 degrees in absorbing the liberated heat from occupants, walls, lights, etc. It can't rise any more unless we furnish additional heat from some other source. If we don't get this other heat, what is the result in the theatre? We first cooled to 62 degrees (saturated)—that was necessary. The rise in air temperature in the room is only 11.2 degrees. The theatre temperature will then be 62 degrees plus 11.2 degrees or 73.2 degrees. What else have we? A relative humidity of 70 per cent with a wet-bulb of 66 degrees.

Is it not reasonable to believe that a temperature of 73.2 degrees in the house, when outside is at a maximum of, say, 95 degrees, is too low to be comfortable? Most of us would probably say the temperature would be more comfortable if the house were 80 degrees. An additional 6.8 degrees rise in temperature, with the same dewpoint, would reduce the relative humidity to the 55 per cent that we previously specified as desirable. The wet-bulb with 80 degrees dry-bulb and the same 62 degrees dewpoint would be 68 degrees, or only 2 degrees higher than at 73.2 degrees room dry-bulb temperature.

The Refrigeration Required.

Now, what about the refrigeration required?

$$50,000 \text{ c.f.m.} \div 13.4 = 3731 \text{ lbs. air per min.}$$

$$\text{Total heat at } 78^\circ \text{ } .405$$

$$\text{Total heat at } 62^\circ \text{ } .273$$

$$\begin{array}{r} 13.2 \text{ B. t. u.} \times 3731 = 49,250 \text{ B. t. u.} \\ \text{Pump 15 hp.} \times 42.5 = 637 \end{array}$$

$$\text{Total } 49,887 \text{ B. t. u.}$$

To cool 50,000 c.f.m. from a maximum outside condition of 78 degrees wet-bulb to 62 degrees sat-

urated, would require 250 tons of refrigeration.

Some of us will say that this is too much refrigeration for this 2,000-seat house. The fact remains, however, that if you have to cool 50,000 c.f.m. from maximum outside conditions to 62 degrees, you can't get away from using 249.5 tons. If you use less refrigeration, you simply don't cool 50,000 c.f.m. to 62 degrees under extreme maximum outside conditions, unless you wanted to use a heat interchanger, which is not the most practical thing for theatre work, and if you do not cool to at least 62-degrees the air will contain more moisture and will result in a higher relative humidity and higher wet-bulb temperature than we are considering.

How can we avoid this high refrigeration load, as well as the heating necessary at the same time and still be able to say that the theatre temperature will not exceed 80 degrees on the hottest day of the summer, and the relative humidity and wet-bulb will not exceed 55 per cent and 68 degrees respectively, regardless of outside maximum conditions.

It is nothing short of wasteful to spend money and equipment and power for its operation, to cool air and condense moisture from large volumes of air and then, exhausting it immediately to outdoors. Why not recirculate a portion of it at least? This procedure, I cannot believe, promotes the hazardous condition, resulting in all sorts of ailments and sicknesses to mankind, that some few in the past have tried to make us believe, but I do know that it does promote economy in plant equipment, size and operation, and gives the desired temperature and humidity conditions as well as air movement in the theatre for comfort.

The Same Problem Considered With Partially Recirculated Air.

Considering the same theatre temperature and humidity desired as heretofore, let us see what happens if we use a total fan capacity of 60,000 c.f.m. dehumidifying and cooling 40 per cent and recirculating 60 per cent. Since we are now recir-

culating some air, we must cool the outside air taken in, to a lower dew-point or saturated temperature to compensate for moisture given off by the theatre occupants. Calculations indicate we must cool to 57 degrees. This cooled air, mixed with recirculated air at 80 degrees gives us a temperature of mixture of 70.65 degrees. This, then, would be the delivery temperature to theatre. In taking up the heat given off by theatre occupants, lights, walls, etc., this 60,000 c.f.m. of air delivered will rise 9.35 degrees, giving 80 degrees as the final breathing zone, exhaust or recirculated air temperature.

Refrigeration required to maintain the theatre temperatures would not exceed 150 tons with this arrangement. A comparison of figures shows:

This represents a saving of 100 tons of refrigeration. Assuming for a moment the power consumption of 1 horsepower per ton of refrigeration, in each case it also represents a total of 100 horsepower saved. Assuming 2 gallons of water required per ton of work done for condensing purposes would indicate a saving of 200 gallons of condensing water in favor of a system embodying recirculation. Allowing the same temperature water rise in the spray cooling system in either case, indicates a saving in the quantity of spray water necessary, in favor of the recirculating system of over 240 gallons of water. Since this water is recirculated the saving by the reduced quantity of water necessary amounts to about 10 horsepower in the motor for the pump. Is not the 100-ton reduction in refrigeration size, 100 horsepower reduced operating cost, 200 gallons per minute of condensing water and the 10 horsepower reduction in pump motor size well worth considering?

I am inclined to believe that I would advocate the downward method of air delivery whenever conditions permit. Often, the owners and the architects have already proceeded with the mushroom method of air delivery in mind, and the architects' layout is too far along

to permit changing this method. Then the same recirculation idea could be followed out with the mushroom method of air delivery as with the downward method. In comprising (and engineering is full

of that) this will give you some idea of the disadvantages set forth above, but will also embody some of the advantages considered possible by the downward method, due to the recirculation of air.

Joint Committee on Standardization of Warm Air Registers Meets at Waldorf-Astoria, New York

Warm Air Register and Supply Men Get Together to Standardize Size of Registers Tuesday, September 4

THE Standardization Committee representing the Register Manufacturers, Western Warm Air Furnace and Supply Association and the National Association of Sheet Metal Contractors, met at the Waldorf Astoria Hotel in New York City, Tuesday, September 4th, for the purpose of determining what would and should be the proper size of registers for first and second floors.

R. W. Menk of the Excelsior Steel Furnace Company, chairman, called the meeting to order at 10 a. m. In the absence of D. E. Cummings of the Thatcher Furnace Company, R. W. Blanchard of Hart & Cooley Company assumed the duties of secretary. The attendance represented over 85 per cent of the register manufacturers and was largely attended by the furnace manufacturers, the supply men and the installers.

The morning session was devoted to the register manufacturers who were more than willing to conform to all motions passed, regardless of whether it would entail additional expenses them. Their one thought was to make registers that would meet the approval of the jobber, the installer and the consumer. This session surely was a lively one and many discussions were entered into. O. A. Jones of the United States Register Company was the target for questions and he was ably fortified for all attacks. L. J. Mueller, Jr., of the Mueller Furnace Company; J. H. Robinson of Hart and Cooley; H. W. Symonds, of the

Symonds Register Company; Trowbridge A. Warner, of Tuttle & Bailey Register Company, are to be congratulated for their efforts in bringing about the great success that was attained at this meeting.

The recommendations that were made (listed below) and would be placed before the Joint Committee in the afternoon session, was satisfactory to everyone that was present, and from letters and telegrams received would be agreeable to those not present.

The afternoon session consisting of the joint committee was largely attended and many subjects were debated on the floor.

A. W. Glessner, representing the furnace fitting manufacturers, gave valuable information and nothing passed until he was absolutely convinced. F. L. Nesbit, representing the Warm Air Furnace & Supply Association, and A. P. Lamneck and George Harms, representing the National Association of Sheet Metal Workers, are to be congratulated for their efforts and energy they displayed in the interest of their associations.

The committee was honored with the presence of Mr. A. E. Foote, of the Department of Commerce (Mr. Hoover's department) and he offered the services of his department in bringing about what he termed "simplification," i. e., to eliminate waste, or in other words, to do away with styles and sizes not necessary.

The sizes that were adopted by the Joint Committee were:

Baseboard Registers: Second floor sizes, 8 x 10, 8 x 12, 9 x 12. Base extension 1 inch, maximum 1 1/4 inch.

First Floor Sizes.

Throat—Outside measurement, 6 1/8 x 10 5/8. Base Ex.—8 x 10, 2 1/4 inch for 8 inch pipe.

Throat—Outside measurement, 6 1/8 x 12 5/8. Base Ex.—9 x 12, 2 1/4 inch for 9 inch pipe.

Throat—Outside measurement, 6 1/2 x 12. Base Ex.—10 x 12, 3 1/4 inch for 10 inch pipe.

Throat—Outside measurement, 9 1/8 x 13 5/8. Base Ex.—11 x 13, 5 1/4 inch for 12 inch pipe.

Throat—Outside measurement, 9 1/8 x 14 5/8. Base Ex.—12 x 12, 5 1/4 inch for 12 inch pipe.

Setting height above finished floor 2 1/8 inches.

No recommendation for 14 inch pipe.

Floor Registers (Second).

8 x 10 for 8 inch pipe.

9 x 12 for 9 inch pipe.

10 x 12 for 10 inch pipe.

12 x 14 for 12 inch pipe.

14 x 18 for 14 inch pipe.

16 x 16 for 16 inch pipe.

Those who were present at the sessions included R. W. Menk and A. W. Glessner, Excelsior Steel Furnace Company, Chicago; Trowbridge A. Warner, A. S. Robertson, W. A. Gill, Tuttle & Bailey Register Company, New York; E. M. Stallemeyer, Walworth Run Foundry Company, Cleveland; Fred M. Devlin, Philadelphia Hardware & Malleable Iron Works; Clarence Lyman, International Heater Company, Utica; E. A. Moncrief, Henry Furnace & Foundry Company, Cleveland; Henry F. Droegkamp, Wisconsin Sheet Metal Contractors' Association; F. J. Nesbit, Standard Furnace & Supply Company, Omaha; A. O. Jones, United States Register Company, Battle Creek; H. W. Symonds, Symonds Register Company, St. Louis; James H. Shenton, William Highton Sons Company, Nashua, New Hampshire; J. H. Robinson and H. S. Covell, Hart & Cooley Company, New Britain; A. P. Lamneck, George Harms and W. Drake, Na-

tional Sheet Metal Contractors; A. E. Foote, Department of Commerce, Washington; E. A. Scott, Frank K. Chew, *Sheet Metal Worker*; W. C. White, AMERICAN ARTISAN AND HARDWARE RECORD.

Letters and telegrams were received from the following which indicated their loyal support of the findings of the Joint Committee:

Green Furnace Company, Auer Register Company, National Warm Air Heating and Ventilating Association, Haynes-Langenberg Manufacturing Company. A wire from S. J. Burgess, of the Rock Island Register Company, stated that his wife's serious illness necessitated his remaining with her.

BASEBOARD REGISTERS.

Second Floor Sizes.

8 x 10. Base extension, minimum 1 inch, maximum 1 1/4 inch.

8 x 12. Base extension, minimum 1 inch, maximum 1 1/4 inch.

9 x 12. Base extension, minimum 1 inch, maximum 1 1/4 inch.

First Floor Sizes.

8 x 10, 2 1/4 inch. Base extension for 8 inch pipe.

9 x 12, 2 1/4 inch. Base extension for 9 inch pipe.

10 x 12, 3 inch. Base extension for 10 inch pipe.

11 x 13, 5 1/4 inch. Base extension for 12 inch pipe.

12 x 14, 5 1/4 inch. Base extension for 12 inch pipe.

No recommendation for 14 inch pipe. Height of first and second floor registers to be not less than 2 inches or more than 2 1/4 inches.

Second Floor Registers.

8 x 10 for 8 inch pipe.

9 x 12 for 9 inch pipe.

10 x 12 for 10 inch pipe.

12 x 14 for 12 inch pipe.

14 x 18 for 14 inch pipe.

16 x 22 for 16 inch pipe.

Thatcher Furnace Company Moves Executive Offices to Newark.

The Thatcher Furnace Company, for a number of years with headquarters at 135 West 35th Street, New York City, announce the consolidating of the executive and manufacturing offices. These will be located in the Thatcher Administra-

tion Building at Newark, New Jersey.

The manufacturing plant has for some time been located in Newark. The New York sales rooms will remain at 135 West 35th Street.

The Chicago sales office and warehouse are located at 341 North Clark Street.

Rules for Safety in Case of Fire.

Never go to bed without knowing the quickest, safest way to leave the house.

Keep the halls, stairs, doors and fire escapes free from obstruction.

Give the alarm promptly by calling "Fire!"—unless in a crowded room.

In a crowded room give the alarm quietly and keep the people calm.

Know where to find the nearest fire alarm box, and study the directions in advance.

Wait by the box, if it is outside of the burning building, so as to direct the firemen when they appear.

If you send a telephone alarm, call the operator and say, "I wish to report a fire," and be sure to give the address.

If your door is closed, put your foot behind it and open it cautiously. Slam it shut if the fire threatens to rush in.

If there is smoke, but no flame, in the hallway, tie a wet cloth around your mouth and nose, and crawl on your hands and knees if the smoke is dense.

Close all doors that you pass, in order to retard the spread of the fire.

Do not jump from a window unless it is absolutely necessary. It is better to tear a sheet into strips, tie the strips together into a rope, fasten one end of the rope securely, and slide to the ground.

If you have to jump, throw out mattress and bedding to break your fall.

Always save life before property. In saving property, take out the most valuable things first.

Don't throw breakable things from the windows.

Good Store Front and Well Arranged Display Room Are Efficient Helps in Selling Warm Air Furnaces.

Ray E. Taylor of Fox Furnace Company Shows His Customers How to Make Right Use of Their Business Places to Attract Customers.

ON various occasions, AMERICAN ARTISAN has laid stress on the wisdom, on the part of warm air furnace installers, of so arranging their offices and business places as to attract favorable attention of prospective customers to their work and the apparatus they install.

A well arranged stockroom, a good looking window display and other means of showing the apparatus, both in part and complete—all of these help to impress the prospect favorably, and money spent for such is always well spent.

The views shown herewith are reproduced for the purpose of demonstrating how this can be done at comparatively little expense. The photographs were taken in the Cleveland branch office of the Fox Furnace Company, the arrangement having been planned by R. E. Taylor, who is in charge of this branch and who is well known in the furnace trade as a salesman of exceptionally high ability.

The showroom is arranged so that the visitor may see the several sizes of the Sunbeam furnace in both pipe and pipeless designs, with

and without casings. The main feature of the exhibit, however, is at the back of the showroom where a pipeless and a piped furnace are set up with all their connections, and here the dealer may bring his customers and explain to them various

the visitor, be he a dealer or dealer's customer, may examine the system complete.

Arranged along both side walls, as shown in the illustration, are several Sunbeam furnaces, and the office is directly across the aisle from the two connected furnaces referred to in the foregoing.

Painted on the window is the familiar curved arrow used in all Sunbeam advertising, and bearing the wording: "Fresh, Moist Air Rising from this Warm-Air Heating System, Circulates Health and



View of Display Room in Cleveland Branch of Fox Furnace Company.

parts of the heating system he proposes to install.

These two furnaces, as shown, are set on the main floor, under the mezzanine, with their pipes and registers in the floor above. Thus

Comfort Throughout the House." Readers who have been studying the subject of advertising will recognize the value of showing this curved arrow in the window to be as great as the sign overhead.



To the Left—Representing Pipeless and Pipe Installations of Sunbeams, Under the Balcony, Registers Being Placed in Floor and Walls of Same. To the Right—The Effective Store Front.

Top Head of Classic Metal Tomb Must Not Be Too Great in Projection, in Order to Avoid Distortion of Actual Dimensions.

Mere Overestimating Size of One Member Will Throw Others Out, Causing Shadows and Making the Tomb Appear Shorter Than It Is.

Written Especially for AMERICAN ARTISAN AND HARDWARE RECORD by O. W. Kothe, Principal, St. Louis Technical Institute, St. Louis, Missouri.

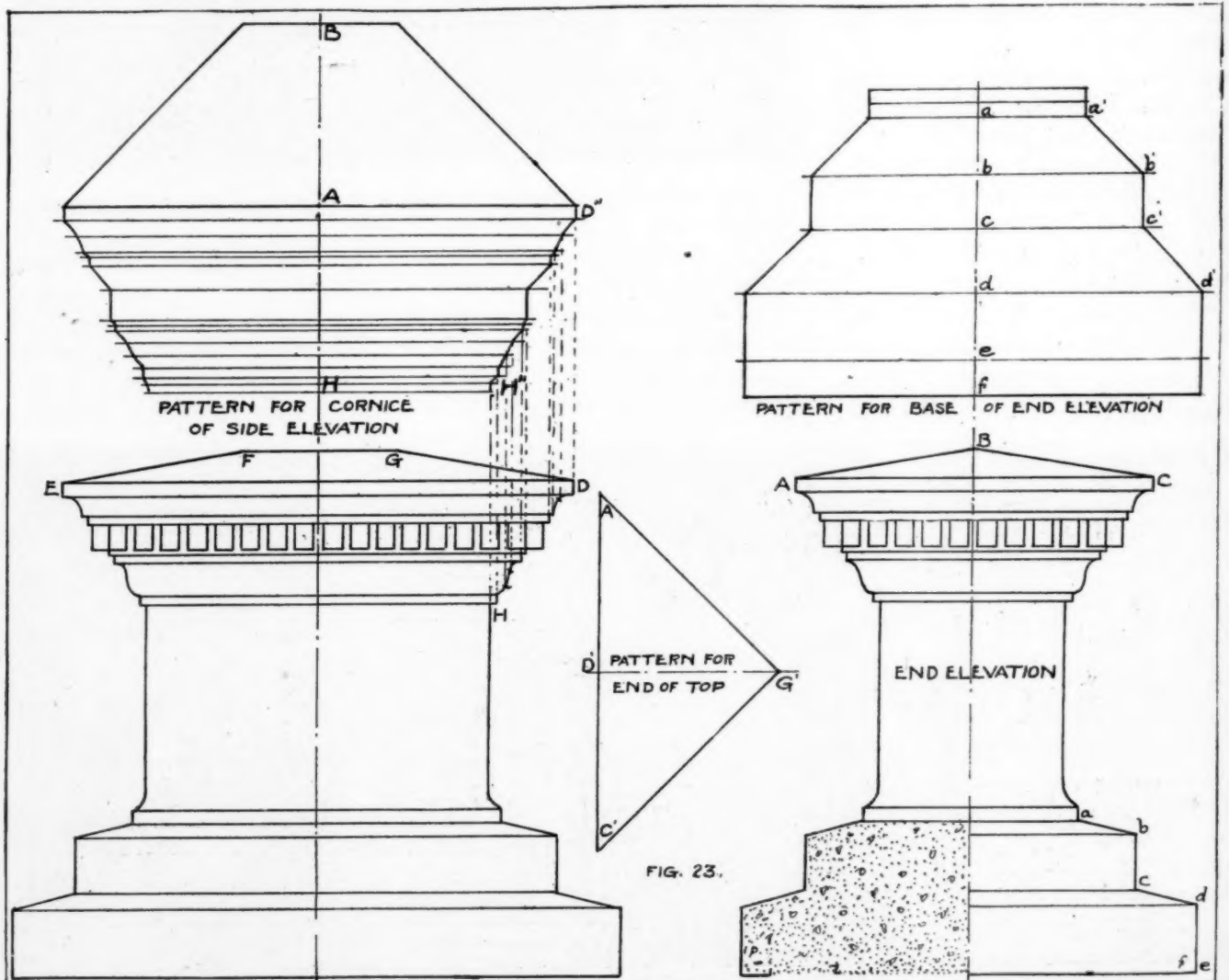
IN OUR drawings in the accompanying figure we take up somewhat of a classic design of metal tomb. In designing tombs of this character, care must be exercised not to get the top head or cornice part too great in projection. In this case the dentil blocks are a little heavy, being too wide in projection, and this makes considerable difference in the overhanging of the cornice as to widths A-C. It is more

noticeable in the end elevation than in the side elevation.

These features are mentioned in order that the trade can see by the mere over-estimating the size of one member, how it can throw out all the rest and how this greater overhang causes shadows of too deep a nature, thereby making the tomb look shorter and heavier, when in reality they should look light, with slender lines.

So we first draw the front elevation working from the center line, designing the members to suit the proportion of the design in the position it must occupy. The ridge G-F is obtained by subtracting the width A-C from the length D-E. What is left is set as F-G and this gives the length of the ridge.

To set out the pattern for the cornice, divide all curved lines in equal spaces, as from G to H. Pick



Working Drawing Shows How to Avoid Distorting Actual Dimensions of Tomb.

these spaces and set on a center line A-H. Then pick the roof line A-B from side elevation and set as A-B in pattern. Erect lines from all points in elevation until they cross stretchout lines of similar number. Through these intersections join lines and you have the pattern G"-H". This pattern is suitable for all four corners of the cornice.

The patterns for the base are laid out in the same way from picking girth a-b-c, etc., and setting it off above the end elevation and developing it as in line a'-b'-c'-d', etc. To set out the pattern for the end of roof if need be, pick the girth line D-G from the front elevation and set as D'-G'. Then draw the line A'-C' equal to that of end elevation and draw the hip lines which gives the pattern.

In assembling these designs of tombs care must be taken to always bend the members to their exact profile, and in assembling, if the corners can be well riveted, should be, and if not, they should be double seamed if possible, otherwise, extra long lugs should be left at intervals and riveted, counter-sinking heads on the outside, soldering over them and then scraping off the solder. All solder marks should be painted over with a solution of blue stone and water and this will cop-erize the solder marks.

Davis Asks Further Information on Koeberle-Harrison Problem.

In our issue for August 25 E. S. Harrison submitted a solution to the problem presented by Koeberle-Heyer Company in the issue of August 4.

Ollie C. Davis, Macon, Georgia, has raised a question regarding Mr. Harrison's solution to the problem and has written us as follows:

TO AMERICAN ARTISAN:

I noticed the solution of a problem submitted in an earlier issue, August 4, by Mr. Koeberle, and the solution by Mr. Harrison.

From the sketches Mr. Harrison submitted it appears the cone is inclined, that the axis is not vertical

to the base, but one cannot be certain as to this important feature, and I shall thank you for details. I should like to know the dimensions, both of the cone and cylinder, diameter of top and bottom of cone section, the height, the angle at which

the cylinder intersects the cone, diameter of cylinder and particularly whether or not the cone axis is vertical, or if inclined, the angle of axis to the base.

OLLIE C. DAVIS,

Macon, Georgia.

All Good Men and True—Appointments by President Pierpoint to Standing Committees.

Sheet Metal Contractors Are Urged to Keep in Close Touch with These Committee Men.

ACCORDING to a letter from Secretary Edwin L. Seabrook, the following men—all known for their progressiveness—have been appointed by President J. A. Pierpoint of the National Association of Sheet Metal Contractors to serve as members of the standing committees.

Sheet metal contractors, whether members of the Association or not, are invited and urged to communicate with the respective committee men on subjects about which assistance may be needed.

The appointments follow:

Warm Air Furnace.

E. B. Langenberg, 4519 North Euclid Avenue, St. Louis.

J. H. Hussie, 2407 Cuming Street, Omaha.

Gust Krack, 1018 West 19th Street, Erie, Pennsylvania.

J. D. Gerken, 25 Ontario Street, Toledo, Ohio.

F. J. Hoersting, 1133 West Third Street, Dayton, Ohio.

Vocational Education.

H. A. Daniel, 115 Clark Street, Newburgh, New York.

W. J. Keist, 321 Stanford Street, West View, Pittsburgh.

C. H. Spann, 718 Granby Street, Norfolk, Virginia.

J. E. Merrick, Shelby and Madison Streets, Louisville, Kentucky.

Max Walten, 1313 West Street, N. W., Washington, D. C.

Fire Prevention.

John Bogenberger, 661 Hubbard Street, Milwaukee.

George Thesmacher, 1526 West 25th Street, Cleveland.

G. B. Detterman, 1145 South 7th Street, Louisville, Kentucky.

H. C. Knisely, 1912 South Western Avenue, Chicago.

Trade Relations and Policy.

E. L. Seabrook, 608 Chestnut Street, Philadelphia.

George I. Ray, Box 1318, Charlotte, North Carolina.

William Stechow, 904 Central Avenue, Cincinnati.

E. E. Miller, 21st and Forest Avenue, Kansas City, Missouri.

F. E. Treuchet, 33 Sanford Street, Springfield, Massachusetts.

Overhead Expense.

W. H. Tinney, 63rd and Woodland Avenue, Philadelphia.

R. E. Pauley, Lock Box 513, Mason City, Iowa.

John Foster, 217 South 4th Street, Springfield, Illinois.

A. I. Rice, 334 Perry Street, Trenton, New Jersey.

R. E. Piper, 1522 West Broad Street, Richmond, Virginia.

Labor.

W. F. Angermyer, 714 Homewood Avenue, Pittsburgh.

John Weigel, 664 East McMillen Street, Cincinnati.

W. E. Lamneck, Columbus, Ohio.

S. P. Moncrief, 62 Hemphill Avenue, Atlanta, Georgia.

H. T. Halverson, 189 Federal Street, Portland, Maine.

G. A. Wieland, 1133 Howard Street, San Francisco.

Joint Committee on Publicity.

E. C. Barrett, 115 Ottawa Street, Joliet, Illinois.

B. B. Van Houten, 320 Broadway, Macon, Georgia.

LeRoy Danzer, Hagerstown, Maryland.

Standardization.

George Harms, 1313 South Adams Street, Peoria, Illinois.

H. F. Droegkamp, 1515 Fond du Lac Avenue, Milwaukee.

W. A. Fingles, 29 South Howard Street, Baltimore, Maryland.

When the Overhead Becomes a Dead Loss.

Like the air we breathe, the overhead is always with us and we cannot escape it any more than we can escape death.

The Big Idea being to get folks to come in, so as to lower the overhead average per customer, the merchant on his toes for business will take great pains to see that none who comes in is sorry for his coming and through neglect, inattention, discourtesy or other cause is persuaded to leave feeling aggrieved.

Vocational Education Will Restore Sheet Metal Trade to High Plane, Says O. W. Kothe.

Problem Is One Requiring Sympathetic Treatment from Both Employer and Apprentice.

Written Especially for AMERICAN ARTISAN AND HARDWARE RECORD by O. W. Kothe, Principal, St. Louis Technical Institute.

Part II.

SO MANY people of today are harping on the apprenticeship question. The employer wants unlimited control, and the men want it also. The fact is, neither one is capable to cope with the present conditions. They all think they are—they all make wonderful promises, but it is doubtful if the present scheme of things will last another twenty-five years. The employer has made a splendid effort; he has tried to send his apprentice to trade school evenings and afternoons. But that somehow does not meet the heart of things yet.

You know, twenty-five to forty years ago when a man received from \$1.25 to \$3 a day and worked ten or twelve hours—work was not so hard to get—there was no high pressured soliciting or advertising. In fact, a man's customers were his as long as he wanted them, and the work was brought to the shop. The employer could afford to spend a few hours a day giving definite instruction to the apprentice. The journeyman could also do that and nobody would say a word.

It is different today where journeymen get \$8 to \$10 or more a day. The employer must bring in business or he is going to fail—it is his livelihood and he has more to lose than a journeyman who too often only thinks and cares of his wages.

There are two sides to every question—too often, the employer can only see where he is going to clear himself of a tight place, and the journeyman feels at the wonderful big profits he is making for his employer. Maybe he is, and maybe he is not. The death rate of sheet metal shops is something terrible. It all shows a lack of scientific managerial ability. What else is to be expected; when the employer must

chase after jobs, and collect his money; while the journeyman must go through the harness to make up the losses that leak out in the meantime somewhere.

What is the theory they work under? It is this: Jim Smith is learning under some old employer, possibly; he may be a well trained and successful man. But the employer does the planning of the technical aspects of the work and directs his men to do things thus and so. Finally the said Jim knows how to do things as well as any one in the shop. The fact is he knows only the practical, not the technical; and then some day a bee is buzzing in his ear, and suggests at the splendid success his boss made; that he can do the same thing. And so he enters business and takes on an apprentice. Well, in due process of time, this apprentice will know less than Jim learned, since Jim has not the time to teach the boy. However, in due time, this apprentice Steve, as we shall call him, has become a journeyman, and works a few years, saves \$500 and enters business. He in turn has taken on Hans as an apprentice, and Hans will learn less than Steve learned because apprentices are now doing only flunky work in nine shops out of ten.

What can a boy learn, when the men themselves have let the trade run away from them. Still the boy associates more with the men and feels that some time he will know all the wind of his superior. When the apprentice is out of his time—he is let out, and must go elsewhere to prove his ability before his employer will hire him back again. It is truly wonderful that more of these boys do not end it all, judging from the terrible experience they have to go through before they can hold a job of any consequence.

Economic conditions force the employer to act as he does; and too often the journeyman wants to do the work that would otherwise be suitable for the apprentice; I mean these thirty-cent journeymen, and hence the apprentice is stifled, stunned; made to feel that this thirty-cent work is all there is to the trade, and that he knows everything there is to be known, and that it is useless for him to study further.

The employer wants unlimited apprenticeship representation; which to him, of course, is a great exploitation. He is the very man who is yelling about poor mechanics, and if he had unlimited apprenticeship capacity he would have a whole lot more. The late war is an example. Thousands of men who used to rivet steel hinges on metal boxes, or work power presses in assortment shops, or do soldering in a factory, or do stove work—all have flocked into the ranks and expect to get the full cream.

In addition, none of us knows how many young fellows are working six months in Jim's shop, quits, and travels to another town and poses as a mechanic. If not, then at least as an apprentice of two years' experience. When he has worked here a few more months he again travels further and sets himself up as a journeyman of profound ability. If he is put with another mechanic, and generally new men are—he just follows the lead of the older mechanic, and most any farmer can get by on a lot of work that way. I say, none of us know how far this condition is practiced. I know it exists, having met with it many times. With unlimited apprenticeship, this condition would be even worse.

To my observations the natural and logical outgrowth of the future will be by means of vocational education. High school boys will be encouraged to enter Sheet Metal Vocational work or plumbing work or such other work. Here these high school boys will receive two years in vocational training; that is, shop work, designing; the more

general pattern drafting; calculation; estimating; cost finding; plan reading; how to manage men, jobs, etc., etc. In vocational work, they will learn to operate all manner of machines, power machines, etc.; with lectures on performing the outside work; taking them around jobs every now and then to see how the actual work is done.

In the shop they are taught to do work neatly; to make edges properly, and how to govern the work in the most systematic and efficient way. Mind you, not 95 out of 100 tradesmen learn these things in a shop today, and only acquire them after being at the trade about eight to twelve years, including their apprenticeship. In fact, there are multitudes of men who claim to be first class men, but who really do horrible work in the shop; everything they touch is botched up. Age and experience seems to be no help to remedy this pitiful condition either; because when men with twenty years' experience butcher and bang up the work, a person must often ask in amazement, where their first class comes in at.

But under the vocational system these young men will be taught for about two years, and as employers need an apprentice they secure one from the school, rather than from the street or the farm. Here we will have a boy, when he gets three years of practical experience he will be about ten times more valuable than the present apprentice out of his time. With a few more years of experience, he will be head and shoulder above the masses of mechanics who refuse to improve their knowledge. This is no idle prediction, either, because I know what education does for my students, and where it puts them in a few years' time.

It will be this new sort of men who will bring the sheet metal trade to its highest standard. They will possess a much higher order of education, and they will do more development work; and because they have history to go on—how past generations have butchered up the trade simply for an immediate

profit. They will know how to build more substantial, more solid, where quality takes first place.

Then because of their lighter training and capacity for greater organization, it is entirely probable that each state organization will index its membership—employers, journeymen, apprentices, and subscribe them in classes of A, B, C, D, etc. The work they will cater to, and were trained in, will be their class. They will not be able to "fourflush" on the public by being brought up as plain job repair men, and then by mere nerve call themselves "heating ventilating men," or such other first class position. Employers are the same as journeymen in the above respect—each tries to edge his way into something better and more profitable without working for it. But their training does not qualify them for it; and they just make the public pay for their personal experimenting.

It is of course evident that this thing will take about twenty-five years to usher in, maybe sooner, maybe later. There are, of course, many employers and journeymen who will fight this issue tooth and nail. The employer may have to pay the school apprentice a little more money than he has to pay some green kid from the street or the farm. But the greater service he will secure will more than offset the difference.

There are a lot of men who will throw all the cold water on an issue like this they can—in fact, mostly those who now set their face like flint against education. All broad-minded men fight for the issue because it makes a better trade for our children, and their own old age, and that is worth a whole lot. Young mechanics of today who are 20 to 30 years old will no doubt witness this change; and it all depends on how they conduct themselves during this time—if they will have made a place for themselves that no one else can dethrone; or if they will have to cry that they never had a chance; that an opportunity never came their way—that they did not have the advantages of the young

men of tomorrow and all such other bunk.

Please remember that there are far more opportunities in the world today than ever existed, and the only fellow that is preventing their development is too often your very self.

These are no idle fancies, either; the handwriting has been on the wall for some years already; it is growing more plainly year by year. All large cities have one or more vocational schools, in addition to what the public schools are putting in. Even comparatively small cities of 10 to 15 thousand population have sheet metal vocational classes, and every year more and more are added. The Government is contributing a considerable sum of money every year to further the institution. The need is recognized, and the public will have its way—sheet metal or no sheet metal.

So those employers and journeymen who refuse to believe it—who will oppose the issue tooth and nail—they will only spite their nose on their own face—they will hold themselves poor in spirit and in worldly goods as well as be always on the wrong side. There is not one of you need believe these things—you can jolly yourself along into oblivion, if you want to.

It is no false statement that it is beginning to be recognized that neither the employer nor the journeyman are in a position to properly train the coming new generation. The employer has no time, even if he has the ability, and the journeyman is driven so hard to produce results—that he is not in a position to teach even though he would want to.

But so many refuse to impart what little knowledge they do possess—they refuse the apprentice to try his hand with tools—they do nothing but scold him, belittle him, so that it is no wonder only the dopiast boys really stick it out. All the rest quit long before they have gone very far. No self-respecting person, even though he be a boy, will swallow all the profane language a dozen journeymen and an

employer can heap on him with all the hammer and tongs of fire and brimstone they know how. Not one of these men would stand it himself, and far less stand for it to have their own boy abused in that manner; still they feel it is perfectly natural and proper to abuse somebody else's boy that way.

These are the things that are ruining the trade—the higher skilled mechanics who were once in the large majority are now in the small minority. They can not support that riff-raff any more, and that riff-raff element positively refuse to prepare themselves to be equal to the trade, consequently the pincers of economics will have to squeeze them more and more as they get older until they will have to take up some other line of work or work for less money, or what they can get. A multitude of young men who have entered the trade since the war will especially experience the economic pincers, unless they take the log chains off from their brain.

The public will not pay such men \$8 and \$10 a day to experiment on their work. There are plenty of substitutes for sheet metal which the public can use if they wish to put on a strike against sheet metal, and then the suffering will begin.

In closing, I hope the men who really need this article will read it. At any rate, I hope a general discussion can be developed that will arouse new interest in the trade and make it profitable for everybody, old as well as young, and the crippled also. But in taking up this matter, let all of us refrain from using personalities—remember, we are seeking a way out of our present condition—to heap a lot of abuse on a writer only discourages a lot of others who may have some practical solution. In a way we must all take a part of the blame for the present conditions; and if enough tradesmen partake in the correspondence, no doubt something can be developed that is of real advantage to many a struggling fellow craftsman.

Send photos of sheet metal work.

Information for Tinnners in "Household Mechanics."

The Manual Arts Press, Peoria, Illinois, has now ready for distribution copies of "Household Mechanics," which consists of a series of thirty-two job sheets by Earl L. Bedell of the Detroit public schools. These sheets were edited by K. G. Smith, State Supervisor of Industrial Education, Michigan.

These sheets represent the latest development in shop teaching. Each one presents information concerning one complete job. It covers tools, materials, references, procedure, the pupil's estimate of his own work, and questions on facts that should be learned. It includes a wide variety of house construction and repair problems in woodworking, plumbing, soldering, electricity, glazing, finishing, etc. The information on each sheet is of such a nature that the student can work out his own problem with the minimum amount of attention from the teacher.

The information to be found in this series is of much practical value around the household and could not fail to be of interest to the home owner. The price is 55 cents.

For further information write to the Manual Arts Press, Peoria, Illinois or to AMERICAN ARTISAN AND HARDWARE RECORD.

Punching with a Whitney Lever Punch Described in Folder Just Out.

"On the job, but not on the pay roll" and "the invisible extra man" are two of the indorsements which characterize the Whitney Lever Punches in the new folder issued by the W. A. Whitney Manufacturing Company, 715 Park Avenue, Rockford, Illinois.

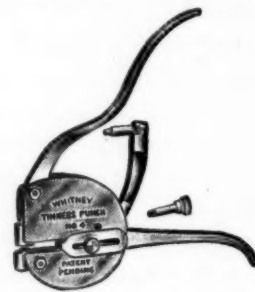
The following announcement by the Company is also made:

"We have added another punch to our make of tools.

"It is a One-Handed Punch, with capacity of $\frac{1}{4}$ inch hole through 16-gauge iron. Construction is simple, and with few parts.

"The opening in jaw, for insertion of metal to be punched, is about $\frac{1}{2}$ -inch deeper than any other punch, it punching to center of $3\frac{3}{4}$ -inch circle.

"Construction is similar to our No. 2 punch, of which there are about 20,000 in use, having an intermediate part, as shown in cut of



Whitney One-Handed Punch.

opened punch, for slotted-head punch to be inserted. A side gauge governs depth of rows of holes from edge of metal being punched, which added favorable feature discriminating Tinnners will appreciate.

"The front punch-holding lip is bevelling to a centering point, so point of punch can be readily seen, to lay out work. The tool, on account of its many desirable new features will undoubtedly find a ready market with workers in the lighter metals."

The Company states that six United States navy yards and arsenals are equipped with the Whitney Lever Punches.

The Two-Dollar Bill Is Here to Stay for Some Time.

There are many folks who want to know why two-dollar bills were ever started, when there is no equivalent in coin for them. Treasury Department officials say that in the old days after the civil war, two-dollar bills took the place of fives and tens now. It was a convenient denomination, and was then big money, and brought the complacency which fives and tens bring now.

In the old days possession of two-dollar bills meant a Saturday night in town, and the leading pastimes of a hot night in town were on a two-dollar basis, but times have changed.

How Big a Load Can You Carry, Mr. Sheet Metal Shop Owner? Better Know Your Limit.

Greenberg Says You Can Lift One Hundred Pounds Ten Times, but Not Thousand Pounds at Once.

Written Especially for AMERICAN ARTISAN AND HARDWARE RECORD by
J. C. Greenberg, Cleveland, Ohio.

ON the way over to Jimmie Killitt's shop I stopped over at Moyer's to see if there was anything he wanted to order. Imagine my great surprise when I saw Jim working over a bench mending radiators for Moyer. I could not find words for a moment, but finally I said:

"Hello, Jimmie, what are you doing here?"

"Back to the tools again for me," said Jimmie, looking up. "I have had enough of that boss stuff for mine. I've been in business for two years and had to give up."

"I thought you were doing fine over there, Jimmie, what went wrong?" I asked.

"I thought I was doing fine, too," Jimmie replied with a grin. "But after two years of business I ran up against that factory job and broke my neck."

"How did it happen?" I asked. "Tell me about it. I am sure sorry to hear about it."

"There isn't much to tell," Jimmie replied. "I bid on that factory job which included all of the ventilator work and roofing and everything. I arranged for the goods because the factory people guaranteed the bills would be paid. Well I got started all right, but they found out that the bank would not give them enough money to carry the job through. It seems that some of the stockholders in the project were not in possession of all the facts, and when they found out that it was only a cheap stock selling scheme they shut down. The bank was the principal stockholder, and when they woke up, it was all off. The whole thing went to smash, and and I am about two thousand dollars in the hole and not a nickle to my name. So here I am back to

the tool box and steady wages from now on."

"How came you to get that job in the first place?" I asked. "It seems to me that the other sheet metal shops could have taken it away."

"My bid was the lowest, and seeing that I could get the goods for the job on their guarantee, I fell

One in Every Tin Shop

Have you one of those irritating puzzles in your tin shop? One of those tiny thorns in the "finger" of your business which festers up and interrupts the smooth rhythm of an otherwise well-oiled machine?

Write to American Artisan concerning your troubles and have those bothersome difficulties cleared up.

Don't work behind a smoke screen!

Let us help you!

for it, and fell hard too," Jimmie replied with a sigh.

At this point Moyer came up and we got to talking about that factory job, and Moyer told me that he would have taken that job provided that they would come across with sixty per cent after the roof was on, and the balance on completion of the ventilators. But they did not want to listen to that, so he got suspicious and kept his hands off of that job. The other big shops seemed of the same opinion and also kept away. This gave Jimmie a clear field, and he took the hook, sinker and all. Jimmie heard all that was said but kept silent. He realized that it was the truth, but it was too late.

"Jimmie," I said, "I hate to know this. I am sorry to have you blow up after two years of seeming suc-

cess. Let me give you a little dope that you can study over, and when you learn enough about business I will try to get you back in a shop of your own."

Jimmie was all smiles. Moyer seemed pleased too. So I simply asked Jimmie to have lunch with me and hoped to put some sense into his head. While going to the hotel we observed a wagon unloading rails in front of the hardware store next to the bank. This fellow who unloaded the nails was a fine muscular fellow and I observed how easily he lifted the nails from the wagon and set them down nice and easy on the walk. You perhaps know that a keg of nails weigh one hundred pounds.

As we were seated at the table, I recalled the fellow and the nails and said to Jimmie, "Did you notice how easily that fellow lifted those hundred pound kegs of nails from the wagon? Did you notice how easily he set the kegs down on the walk?"

"Yes, I did," Jimmie replied. "It looked like they weighed only about fifty pounds to the keg, but I know they weigh just one hundred pounds."

"I am glad that you have noticed it, Jimmie," I said. "He reminded me of your shop that you had."

"How is that?" Jimmie asked in a puzzled sort of way.

"It is very simple, Jimmie," I replied. "That fellow could lift one hundred pounds fifty times a day; but if he tried to lift one thousand pounds all at once he could not do it. It would break his back."

"Now just what has that to do with my business?" Jimmie asked.

"It has this to do with it," I replied. "You tried to lift a thousand pounds all at once. You were not content with the small one hundred dollar jobs, but you wanted a heavy job like that factory job all at once and you found that you could not lift it. It broke your back. Every man must know just how much he can carry in business. An overload will kill anyone who tries to carry it."

"But I was assured help from the factory people," Jimmie protested. "How was I supposed to know that they would break up?"

"All that is true, Jimmie," I explained, "but all you had was their word. Many a man will promise to help you carry your load, but some of them lay down on the job. You cannot succeed in business unless you have your own assurance. You nor anybody else can depend on someone else to help. You must learn to help yourself. Business is too important to depend just on someone's word. You were really a small business man, but big enough as long as you kept within your own limits. But whenever you see a so-called large concern depend on a small man like yourself to take a big job, there is something wrong and you should learn what it is before you bite on the bait."

"I suppose you are right," Jimmie admitted, "but I am out of luck now and must work at the bench for the rest of my life the way it looks now."

"You can't do that as long as you owe the money you do," I said. "Your obligations must be paid. You cannot do it by working for wages. If you are honest, you will pay up. You owe us about three hundred dollars, and we must have the money. There is only one way for you to be honorable and that is to start in business and pay up slowly and completely. We will give you more goods, and if you will write to your other creditors they will likely do the same thing. Start a shop again and pay up. You are too young a man to fail and have your name shot to pieces. What do you say, Jimmie?"

It is needless to say that Jimmie did as he was advised and is now on the right track. He will succeed because he has learned a lesson. He will make good because he has learned what not to do.

You, dear reader, may be in Jimmie's class. You, too, may be tempted to take a great big job because your bid was low, and find out that you cannot swing the job after you have started. Remember

that it is easier to carry one hundred pounds ten times than to carry a thousand pounds all at once. Many small jobs make many small profits. All big things are made up of little things. A little grain of sand seems nothing, but many grains of sand make a mountain. A little drop of water is a little thing, but the Atlantic ocean is made of little drops of water. Many little jobs make one big annual profit and a big annual profit makes a bigger business.

Forget volume of business and figure on volume of profits. Big jobs can only be handled by business men who have big capital, and you cannot have capital unless you have profits. The little profits are the drops that make the ocean of capital. Go slow and watch your step.

Chicago Elevated Lines Will Use Tons of Corrugated Metal on Roofs of 207 Stations.

It is interesting to note, and the information may be used to good advantage by sheet metal contractors, that the management of the Chicago Elevated Lines will re-roof all of their 207 stations with Armco corrugated iron.

The following article appeared in a recent issue of *"The Pure Iron Era,"* an instructive and easy-to-read house organ of the American Rolling Mill Company, Middletown, Ohio:

"The big element in building for permanence is the quality of the material used in the construction and its maintenance.

"Several years ago the Department of Maintenance of Way for the Chicago elevated railroads was faced with a problem which involved the use of enormous quantities of metal roofing and siding for the purpose of re-covering 207 elevated stations, which are used by more than a half-million people carried by these lines every day. The steel roofing and siding that had been previously used had succumbed to the elements and time, particularly in the Loop district where atmospheric conditions are admittedly se-

vere on any metal surface exposed to the weather. A study was made of the various tests and experiments made by the manufacturers of metal roofing and as a result it was decided to make a practical test of the various metal roofing materials ordered. These were hung in the maintenance shop where sulphur fumes, smoke and other corrosive gases were common, and as a result, rust resisting, commercially pure iron has now been in use on many elevated structures for the past five years.

"Several Loop stations have already been recovered with Armco iron and at the present time work is going on as rapidly as possible on re-roofing 40 of the south side stations.

Notes and Queries

"Kernan" Furnace.

From E. R. Shaw, Director College Life Service Conferences, 740 Rush Street, Chicago, Illinois.

Can you give me the name of the manufacturers of the "Kernan" furnace?

Ans.—International Heater Company, Utica, New York, and 1933 Wentworth Avenue, Chicago.

"Kohler" Stove Pipe Cutter and Crimper.

From P. Hoffman Hardware Company, Sedalia, Missouri.

Please advise us who makes the "Kohler" stove pipe cutter and crimper.

Ans.—Kohler Manufacturing Company, 1923 Carson Street, Pittsburgh, Pennsylvania.

"Hero" Furnaces and School Room Heaters.

From The Walty Hardware Company, Colchester, Illinois.

Kindly inform us who makes the "Hero" furnaces and school room heaters.

Ans.—Hero Furnace Company, Sycamore, Illinois.

Tea Kettle and Coffee Pot Knobs.

From George Alexander, Westerville, Ohio.

I should like to know who makes tea kettle and coffee pot knobs that have the nut encased in knob.

Ans.—E. B. Estes and Company, 111 West Jackson Boulevard, Chicago, Illinois, and 364 Fifth Avenue, New York City.

Miss Minnesota Willingly Teaches Us the Latest Wrinkles in Designing A Hunting Goods' Window Display.

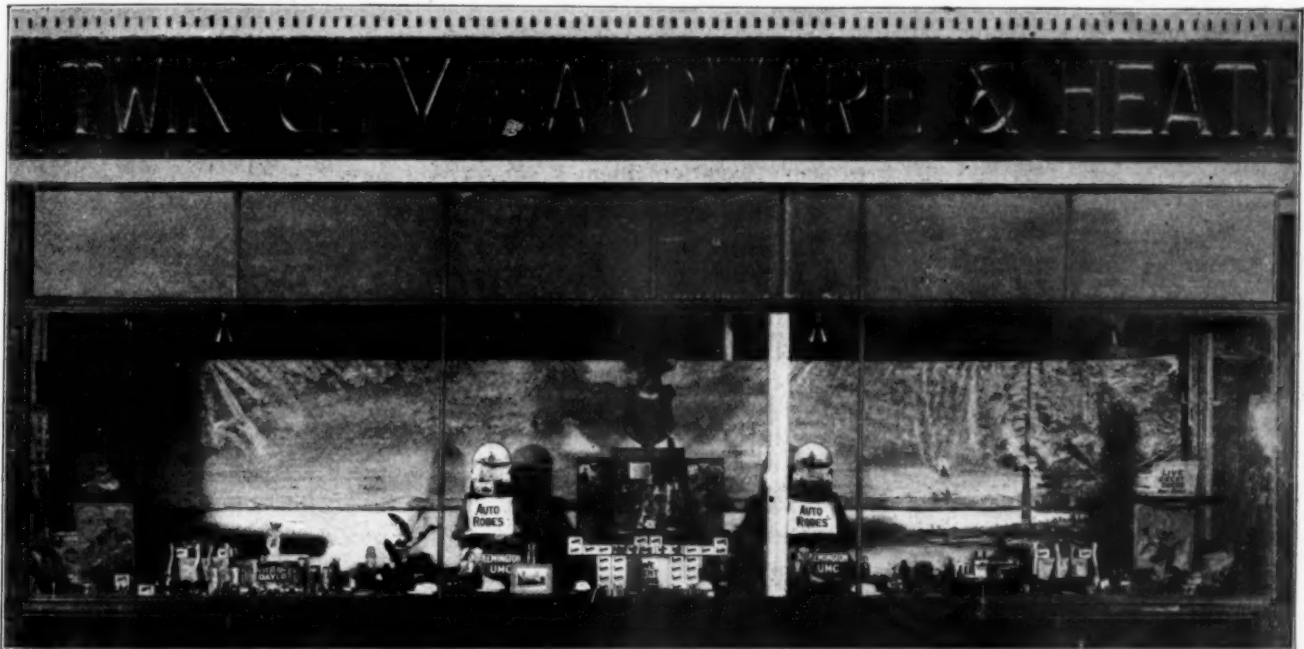
And Who Is Better Able to Do This Than She, Abounding as She Does with Small Lakes and Streams, Near Which the Small Game Lives.

ALTHOUGH the fall season is still some distance from us and we are not yet delivered from the torturing rays of the sun, we will, however, soon be in the midst of that grand and glorious season about which so many poets, writers and the like have waxed sentimental and commonly known as Indian Summer. Already the fall rains are beginning to make their appearance,

he turns to the fall sportsman and directs his efforts toward replenishing the old sportsmans' outfit and to selling the new beginner the necessary equipment for his first fall duck hunting trip.

As usual, of course, the window, that silent salesman who is ever on duty from early morn to late at night, is rearranged and brought into service once more.

arranged by E. A. Sauer for the Twin City Hardware Company, Minneapolis, Minnesota. Abounding in small lakes and rivers as Minnesota does, this would be and is an ideal place to work up a good trade in fire arms and other hunting goods. Hence the suggestions which these men send us from time to time are to the point and reliable.



Abounding As It Does With Small Lakes and Rivers, Minnesota Is an Ideal Place for Hunting and Hence Suggestions From This Section on Arranging Hunting Goods Windows Are Bound to Be Good.

the grass takes on a deeper greenish hue and the leaves on the trees will soon be showing signs of changing their color preparatory to leaving old mother tree entirely.

With all this change in nature preparatory to winter comes the delight of the sportsman, who knows that the ducks will soon be flying and he need no longer content himself with shooting clay pigeons in the parks.

The coming of this fall season opens up an entirely new line of activity for the hardware man; from selling hay forks and binder twine

The hunting equipment display lends itself to so many different variations and departures from the usual routine that it is not at all difficult to arrange an attractive window of this sort. The subject under consideration is in itself an unusually interesting one and the slightest mention of it is enough to arouse the interest of the sportsmen. Then, too, a good use can be made of the suggestions worked out and supplied to dealers by the jobbers and manufacturers of the articles.

The accompanying display was

Some Things That Are Difficult to do for Most People.

- To apologize.
- To begin over.
- To take advice.
- To admit error.
- To be unselfish.
- To face a sneer.
- To be charitable.
- To be considerate.
- To avoid mistakes.
- To endure success.
- To keep on trying.
- To forgive and forget.
- To profit by mistakes.

Placards and Show Cards in Windows Make People Stop to Look, Read and Buy.

I watched the passing crowd stop before the windows of a just-opened store, says John T. Barrett in *Hardware*. Many stopped, and at least 90 per cent stopped for the same reason I had. Pasted on the windows were yellow telegrams, little pieces of paper the power of which to arrest attention and arouse interest is unending. Others, as I had, wanted to know what the telegrams said. When they had read them, with interest now aroused in the store, they gazed at the window display. And many ended up by walking in and making a purchase. Those little yellow placards at least doubled, probably tripled, sales volume on opening day.

The telegrams were simply friendly message to the store manager from out-of-town people. They told him they knew he would make a success. They said complimentary things about his ability to operate a store, and the merchandise they knew he would handle.

There are several clever ways to capitalize the kick which telegrams on a window get from the passing public.

Several recent telegraphed orders, pasted up, impress the public. "If customers like this store well enough to wire it, it must be a good store," is the reasoning.

On the occasion of a special window display of a certain article or line, a telegram from the manufacturer, developing some talking point, is excellent. Most manufacturers will be delighted to extend the co-operation. If the telegram announces an advance in price, and the goods are offered at an old price, the bargain instincts will be played on.

Telegrams, though, are not by any means the only effective window placards. Letters are good. A bunch of mail orders, pasted up, has a lot of appeal. I recall one store which for years has made a practice of pasting mail orders on its windows. It receives many,

from all over the country. Every week in the year mail orders are put up for the crowds to see. The store considers these placards one of the best window ideas it has ever used.

A retailer occupying a downtown corner, with perhaps 100 feet of display window, was notified by agents for the landlord that, after the imminent expiration of his lease, he must pay a much higher rent. He put on an, "I'm Moving" Sale. He backed up his newspaper advertising with window placards which literally stopped hundreds to every ten stopped by other good store windows on the street.

The placards were simply plain manilla paper, about twelve inches by twenty inches. They were written by the merchant himself, in a large legible hand. They were spaced fairly close together on the windows, so that in all there were probably twenty of them. A passer would read one, then would step along to the next, and the next, and the next—often spending a half hour reading them.

They were "human interest" placards. The dealer picked good heads, like these: "A 100 Per Cent Rent Increase!" "Why I'm Moving," "Talk About Rent Hogs!" "I'd Have to Sell." Each message was forty to seventy-five words.

There are still other ways to use placards. Certainly, when a retailer has a large advertisement in a local newspaper, he should clip several copies and paste on windows. Advertisements of individual items sold appearing in national publications often are good placards.

There may be an occasional store, catering to a select trade, which would find placards not in keeping with its dignity, but most stores can use them without detriment and to great benefit. One advantage is their availability almost at a moment's notice.

Never say "I don't know." If you do not know the answer to a customer's question, say, "I will find out," and then ask your superior for the answer.

Herbert M. Rogers Says, Days of Baseburners Are Past, Furnaces Have Taken Their Places.

Do you remember when the old base burner stove was considered the acme of luxury in the matter of house heating?

Herbert M. Rogers, 5202 Cass street, Omaha, Nebraska, head of the Milton Rogers hardware store, believes that the passing of the heating stove is the biggest change in his line of business that has occurred in his life time.

Many new articles of hardware have come into use, ranging from lawn mowers to safety razors. Some old-time articles are no longer in demand. But the change in the system of heating houses is the most radical change he can recall.

"We used to sell heating stoves by the carload," says Mr. Rogers, "but almost every house in these days has a furnace. We haven't sold a base burner in several years."

The first store of its kind in Omaha was located between Ninth and Tenth Streets on Farnam Street, he says, being founded by his father, Milton Rogers.

In 1868 the store was moved to the corner of Fourteenth and Farnam streets where the Woodmen of the World Building now stands, and in 1911 it was moved to its present location at 1515 Harney Street.

Revised Industrial Organization Reference Containing 11,000 Names Released at Washington.

The Department of Commerce has just released a revised and enlarged edition of "Commercial and Industrial Organizations in the United States," which contains a list of more than 11,000 organizations, of local, state, national and international character, conveniently indexed so as to form a ready and convenient reference for the American business public.

Copies may be obtained by application to the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 20 cents prepaid.

Color Combinations Scientifically Arranged in Window Attract Attention and Excite Interest.

Fuehrer, Michigan, Relates Changes in Colors as Range of Vision Changes from Periphery to Center of Eye.

COLORS play a prominent part in attracting attention. Several weeks ago I was attracted to a window which had this color scheme. Draped in the rear center of the window was a 2-yard width of yellow-orange drapery, flanked on each side by a $\frac{3}{4}$ -yard width of light blue drapery, which in turn was flanked on each side by a 2-yard width of black drapery. I had not gone a square farther down the street when I recall that my attention was suddenly attracted to a jeweler's window. What attracted my attention was a reddish-orange triple sign, and as I passed along I caught the name Eversharp. Coincidentally, I had lost my Eversharp pencil some time previous. The sign and the color combinations were the means of reminding me that an Eversharp was a desirable thing to have. Why were these four colors used?

How Attractive Color Combinations Are Formed.

Red, orange, yellow, green, blue and violet constitute the spectral colors from which all available shades and hues are derived. It is found that a color may be red when viewed from the front, but when it is viewed from the periphery or outer edge of the eye it is seen as yellow. By means of a campimeter the psychologist ascertains the mutations each color passes through from periphery to front on a quadrant, with the eye fixated to the front. Red appears yellowish from the periphery of the eye, but as it swings in the quadrant to the front it changes to yellow; from yellow it turns to orange, to orange-red, and finally to red. Orange appears as yellow from the periphery, but becomes more and more orange in front. Yellow appears yellowish on the periphery, but becomes more saturated as it approaches the front. Green appears yellowish on the periphery, gradually increasing in

saturation, assuming a greenish and finally a green tint. Blue becomes more and more saturated as it passes to the front. Violet appears bluish, then blue and finally violet. These changes in color take place with all colors as the angle of vision changes.

As a person passes along the street, engrossed in thought, or gazing ahead, the chances are that the edge of the eye only will be available to receive sense impressions. Such being the case, and knowing that light blue and yellow are the two colors that will be visible under the circumstances, these two colors should constitute the main color schemes of all decorations. Red, however, is the most active color of the aforementioned spectral colors and exerts the greatest nervous activity in the person. It is desirable for that reason to use red in window decorations. But, inasmuch as we must attract the eye of the passerby and assume, consequently, that he is not looking directly at the window until his attention is secured, we use an orange or rather orange-red, rather than pure red. It is orange or orange-red he will see at the angle at which the color will impinge itself on the eye.

Concentrating Attention Necessary in Window Displays.

A limited color clash, also, is available for window decorations. Two antagonistic colors will excite nervous activity desirable for window decorations. Hence, in the aforementioned window where black flanked light blue, the color clash—black and white being called colors here for simplicity—in addition to blue and yellow was utilized as an attracting medium. Black and white are frequently desirable for the color antagonism. Polished aluminum against a black drape is an effective scheme. The polished nickel of a stove against the black

iron frequently affords ample clash. A spotlight on an article with a dark background is suggestive.

These schemes are suggested means by which the window salesman can secure the attention of the passerby. A salesman, however, never sold an article to a customer by regaling the customer with stories. He may use a few stories to secure good feeling and atmosphere; but he must have a selling talk about his article in order to sell. Be careful, then, that your window does not become a mere source of pleasure and entertainment to the passerby. Be sure, then, by placards, labels and other devices to direct the attention of the observer to the articles for sale; and the article for sale should, if possible, be the last impression he has when he leaves.

If I were to speak to you on four or five different subjects within a minute's time, the question of my sanity would be pertinent. There certainly would not be an iota of attention paid to my jargon. That's precisely what you can expect to create when you clutter your window with four or five different things. Speed is desirable, but haste will defeat the aim you are endeavoring to accomplish. Bear in mind that the passerby has but a limited time to give to your window, and frequently does not tarry at all in reading what your window has to say. To expect the passerby to absorb several different objects in a limited time is sheer folly. Sell one thing, but sell it well. To diffuse attention among several different articles in a limited time is to leave no one clear cut image of any one thing, but an unpleasant jumble.

Desirable Color Clashes Are Designated.

Put one article in your window, but show its different phases. After all, what we call attending to a thing for any length of time consists in attending to changing phases of the thing; to ideas associated with it.

The stove on a turn-table with appropriate labels or placards will also illustrate this changing phase of the one thing. Or the stove may be

the central figure in the window and several allied things suitably placed around it, as stove shovel, coal bucket, lid lifter, and a cooking utensil, with or without a ribbon leading from each accessory thing to its particular place of use on the stove. This, also, well illustrates the psychological principle that submitting objects to successive instead of simultaneous inspection produces the maximum of nervous difference.

It is necessary to create an insistent idea something like the following: "Jones Bros. Hardware Company certainly does some fine decorating;" "That was an interesting window at Jones Bros. Hardware Company;" "I think Jones Bros. Hardware Company is a live concern, judging by the decorating it does." That insistent idea of "Jones Bros. Hardware Company," with images of various windows viewed at times to supplement it, is the idea you are interested in keeping alive. It follows that whenever any hardware merchandise is needed in the home, and the impression has been made, the felt need will be associated immediately with "Jones Bros. Hardware Company," and the chances are that Jones Bros. Hardware company will get the trade.

A caution is suggested. Do not fail to change your window decorations frequently. Just as we tire of the repeated story or tale by the same person, so the passerby readily tires of the sameness of the unchanged window, no matter how interesting it might have been in the beginning. When we see the same thing again and again we acquire a habit of seeing that same thing, and habit is the most inimical element to interest. Keep interest alive by frequent changes.

Power of Suggestion in Window Displays.

In the background of all window advertising should be the effort to suggest to the observer, by every device that can be mustered, the desirability or necessity on the part of the observer of the article advertised. Make them feel that they should purchase this thing because they need it, or desire it. Suggesti-

bility varies with sex; women are more open to suggestion than are men. Take advantage of this factor and capitalize it to your advantage.

I shall relate a personal instance in the sale of a Pyrene fire extinguisher. It was suggested to my wife by a window device that the home should be provided with a hand extinguisher. An unprotected home with children in it might mean the serious injury or death of loved ones. A Pyrene extinguisher was purchased for our home. Less than five months ago my wife had to use it to extinguish a fire my little girl had ignited in the kitchen; to this day two large scorched spots on the linoleum mark the place of a near tragedy. The suggestion worked admirably.

Farmer Will Have 200 Million Dollars More to Spend This Fall.

Writing in the *Chicago Tribune* under date of September 1, Arthur Evans says, "It's a big year for the Farmer." Mr. Evans bases his statements upon the report issued by the Department of Research of the American Farm Bureau Federation.

The report says that last year the farmers' gross sales totaled \$8,479,000,000. The forecast for this crop year is \$8,710,000,000.

Last year the tables showed the farmers' cash income divided as follows: Crops, \$4,523,000,000; live stock, \$2,256,000,000; animal products, \$1,700,000,000. This year the estimates place crops at \$4,725,000,000; live stock, \$2,225,000,000; animal products, \$1,760,000,000. In other words, crops will bring in cash \$200,000,000 more than last season, live stock will fetch \$30,000,000 less, and animal products will bring in \$60,000,000 more than last year.

Coming Conventions

Automobile Accessories Branch National Hardware Association, Hotel Shelburne, Atlantic City, New Jersey, October 15 to 19.

The National Hardware Association and the American Hardware Manufacturers' Association, Atlantic City,

New Jersey, October 16, 17, 18 and 19. F. D. Mitchell, 1819 Broadway, New York, is Secretary and Treasurer of the Manufacturers; T. J. Fernley, Secretary of Jobbers.

The twenty-fourth annual convention of the National Federation of Implement Dealers' Associations will be held at Hotel Sherman, Chicago, October 17, 18 and 19, 1923. H. J. Hodge, Abilene, Kansas, is Secretary.

Mountain States Hardware and Implement Association Convention, City Auditorium, Denver, Colorado, January, 1924. W. W. McAlister, Secretary-Treasurer, Boulder, Colorado.

Western Retail Implement and Hardware Association, Missouri Theater Building, Kansas City, January 15, 16, 17, 1924. H. J. Hodge, Secretary-Treasurer, Abilene, Kansas.

The West Virginia Retail Hardware Association, Convention and Exhibit, Huntington, West Virginia, January 15 to 18, 1924. James B. Carson, Secretary-Treasurer, 1001 Schwind Building, Dayton, Ohio.

Kentucky Hardware and Implement Association, Louisville, January 24-25, 1924. J. M. Stone, Secretary-Treasurer, 202 Republic Building, Louisville.

Indiana Retail Hardware Association, Inc., Convention and Exhibition, Cadle Tabernacle, January 29, 30, 31, February 1, 1924. G. F. Sheely, Secretary, Argos.

Nebraska Retail Hardware Association, Lincoln, Nebraska, February 5 to 8, 1924. George H. Dietz, Lincoln, Nebraska, Secretary-Treasurer.

Wisconsin Retail Hardware Association Convention and Exhibition, Milwaukee Auditorium, February 6, 7, 8, 1924. George W. Kornely, Manager of Exhibits, 1476 Green Bay Avenue, Milwaukee. P. J. Jacobs, Secretary-Treasurer, Stevens Point.

Michigan Retail Hardware Convention and Exhibition, Grand Rapids, February 12, 13, 14, 1924. Karl S. Judson, Exhibit Manager, 248 Morris Avenue, Grand Rapids. A. J. Scott, Secretary, Marine City, Michigan.

The Pennsylvania and Atlantic Seaboard Hardware Association, Incorporated, convention and exhibition at the Philadelphia Commercial Museum, Philadelphia, Pennsylvania, February 12, 13, 14 and 15, 1924. Sharon E. Jones, Secretary-Treasurer, Wesley Building, Philadelphia.

New York Retail Hardware Association Convention and Exhibition, February 19, 20, 21, 22, 1924. Headquarters, McAlpin Hotel, and Exhibition at Seventy-First Regiment Armory. John B. Foley, Secretary, 412-413 City Bank Building, Syracuse.

The Missouri Retail Hardware Association, Convention and Exhibition, Marquette Hotel, St. Louis, Missouri, February 26, 27 and 28, 1924. F. X. Becherer, Secretary, 5106 North Broadway, St. Louis, Missouri.

Retail Hardware Doings

Illinois.

Paul Rogers has sold the Homer Hardware store at Homer to S. H. Potter of Sheldon.

Oregon.

The Hicks Hardware store of Silverton has been sold to Ernest Starr and D. J. Murphy.

Volkmann Performs Civic Duty and Corners Cash, Declaring Perpetual National Holiday for Women

Extolls Freedom from Kitchen Worries and Work, and Reaps Well-Earned Reward by Thinking of Others.

AT LAST! someone has hit upon a clever scheme of extolling the hardships of women, and not only doing a service for humanity, but is putting himself on "Easy

Street" in the process. Each day we sit down to our meals with only one thought, that of satisfying our hunger and nothing more. We never stop to think of the time and

thought our mothers have spent first preparing the food and then standing over a hot stove watching it patiently until the heat has prepared it for the table. We celebrate holidays by laying aside our work, but how about mother's holiday? It is feared that we do not give sufficient consideration to this phase of the question.

Volkmann & Sons, Beaver Dam, Wisconsin, however, have started a line of advertising which bids fair to touch the hearts and pocketbooks of those who have heretofore been all too neglectful with regard to the comfort and convenience of those who spend much of their time and energy in the kitchen.

This scheme of advertising brings to mind a thought which probably never occurred to a great many people and therefore it has utility value; it strikes in a vulnerable spot and is sure to bring results.

As a criticism we might say that the border of the ad is needlessly heavy and would have a tendency to detract from the reading matter. The headline is excellent; it is an innovation.

Women Spend More for Cosmetics Than for Electrical Household Appliances.

Household drudgery bears heavily on women.

When household help is difficult to get, electric appliances, gas, running water, etc., greatly lighten the burden of household drudgery.

Yet—

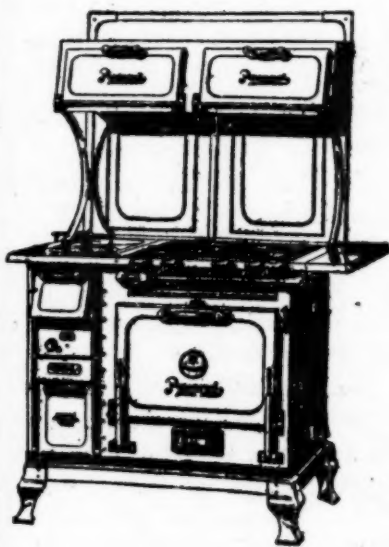
American women spent almost as much on cosmetics in one year as has been spent in all years, up to date on electrical labor saving appliances.

Statistics compiled show that there are in American homes only 20,684,600 of the commonest labor-saving electric devices. The gross retail sale value of these devices was \$782,865,000. On the other hand Federal luxury tax records show that American women spent in one year \$750,000,000 for cosmetics and "beautifiers."

A New National Holiday for Women Has Been Declared

At last a national holiday that can be celebrated 365 days a year. It means absolute freedom from kitchen worries and work.

Come down to Volkmann & Sons and sign your Declaration of Independence from kitchen slavery. Buy a PARAMOUNT Gas-Coal Combination Range.



Paramount
WALLEAU

PARAMOUNT Gas-Coal Combination Ranges offer a variety of styles that will answer your individual taste.

The coal section of the range illustrated is composed of a two hole cooking top and oven. The gas section is composed of a five burner cooking top containing four giant burners and a simmer burner. Above the cooking surface are two warming closets.

There are PARAMOUNT combinations for all types of kitchens, large or small. Come in and pick yours out today. Unusually liberal terms if desired.



Volkmann & Sons
Beaver Dam, Wisconsin

The following table shows the number of electrical labor-saving appliances in use in the United States:

Irons	7,000,000
Cleaners	3,850,000
Fans	3,500,000
Washers	2,915,000
Heaters and Radiators...	1,260,000
Toasters	1,000,000
Percolators	500,000
Sewing Machine Motors..	437,000
Ironing Machines	116,000
Dishwashers	10,600

But women are awakening con-

stantly to the value of these labor-saving appliances, and every year they are being used more and more.

This increasing use is due to the fact that manufacturers and retail merchants in electrical utilities have realized within the past few years the great value of advertising as a sales creator and stimulator.

When stove manufacturers and retail stove merchants as a class, arrive at this point, the stove business will be more profitable for all concerned.

Stove and Furnace Manufacturers and Retailers Are Vitally Interested in Uniform Principles of Cost.

*Lack of Knowledge of True Costs Always Means Loss
of Profits to Makers and Higher Prices to Consumers.*

THE following principles are suggested by the Cost Committee of the American Foundrymen's Association, to which many stove and furnace manufacturers belong, and of which W. B. Greenlee, President of the Northwestern Repair Company, is chairman.

It is recognized that many of the unprofitable and otherwise unsatisfactory conditions in both of these fields have their cause in the fact that in many foundries there is no really efficient cost finding system, so that the management never really knows what its foundry costs are.

It is, therefore, a matter of interest to those who sell stoves and furnaces at retail that there is a well organized movement among foundrymen to reach an agreement as to the items which should be included in actual foundry costs, and the statement which was formulated by the above mentioned committee is considered of importance enough to give it further publicity through AMERICAN ARTISAN.

The statement follows:

Cost Principles Suggested by the Cost Committee of the American Foundrymen's Association.

1. Cost should be determined for pounds of good castings produced during stated periods (usual-

ly monthly) for individual castings, classes, customers, or the foundry as a whole as conditions may require.

2. Cost factors should be distributed departmentally so far as practicable.

3. In figuring costs of individual castings, classes or customers, certain expenses should be applied specifically. The expenses which cannot be charged directly should be applied partly on the basis of direct labor and partly on the basis of a uniform cost per pound of good castings produced.

4. Costs should be kept according to the way sales quotations are made, that is, either by individual castings, classes or customers. This will make it possible to compare costs with selling prices.

5. Costs should include all expenses incident to the manufacture of castings including interest, depreciation and reserves.

6. Cost estimates prepared for the purpose of determining sales quotations should be based upon normal operation and current market prices. Normal operation means that percentage of full operation which will represent average business taking into account class of work and facilities. This percent-

age will be somewhere between minimum and maximum and should never be considered the maximum. The purpose of figuring normal costs at all times is to absorb during periods of good business the idle expense incurred during periods of low production.

7. In making cost estimates for the purpose of sales quotations consideration should be given to the yield or the percentage of good production to the metal charged. It is believed the importance of yield as a cost factor is not generally recognized by the foundry industry.

Things That Some Employees Never Think of.

1. The capital stock tax on a business.

2. The personal property tax on a business.

3. The real estate tax on a business.

4. The income tax on a business.

5. The plant and equipment investment.

6. The depreciation of equipment.

7. The interest on borrowed money.

8. The stockholders' rights to dividends.

9. Waste and spoilage due to employees' carelessness.

10. Hazards of strikes, fires and delays and losses usually referred to as acts of God, but which are in most cases acts of devilish men.

11. Fluctuations in demands and losses due to business depressions.

12. Cost of Employer's Liability Insurance.

13. Loss of employers' time through real or imaginary illness.

14. Losses on bad accounts.

15. The let-down in an organization by reason of vacations.

16. Other non-productive expenses such as fire insurance, sales expenses, legal counsel, fees to public accountants and auditors, time wasted in making out countless government reports, keeping books and so on.—Ward's Words.

The Essence of Clever Advertising: Telling Your Story in a Simple, Common-Sense Manner That Strikes "Home."

A Good Test: If Clerks Talked in the Language of Your Ad, Would They Make Sales or Would They Make Themselves Ridiculous?

THE illustration herewith is a reprint of an ad used by Holder Hardware in the Bloomington (Illinois) *Bulletin*.

The use of illustrations in this ad is good. The wording is to the

Many stores make a practice of running Friday and Saturday special sales. These sales, of course, are put on for the purpose of disposing of odd lots and to bring people to the store. On these occasions

some article which they particularly want. Under these circumstances, when they do come to town, they can generally be influenced by clever displays, etc., to fill their other needs at the same time.

This is particularly true in the rural communities where the buyers are mostly farmers. These people make a practice of coming to town

BURPEE'S SEEDS GROW

Our Aim Is To Supply Only The Best Seeds That Can Be Grown

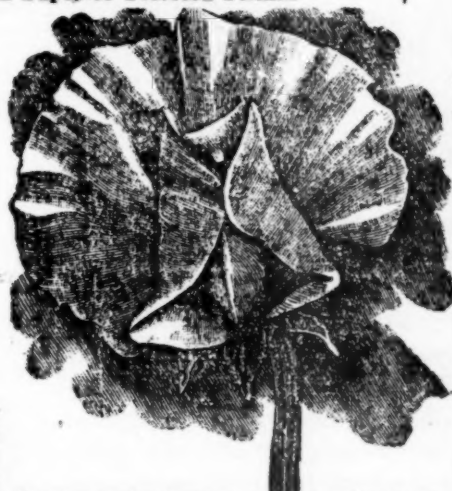
Seeds Saved From Superior Selected Strains

Burpee's
Best Mixed
Sweet Peas
Mixed Dwarf
Climbing, Tall
Nasturtium
For Your Garden

RADISHES
LETTUCE
BEANS
BEETS

If We Haven't Got It,
Let Us Order It.

Every year many people are in need of special kinds of seeds shown in Burpee's Catalogue, which are not carried in our regular stock. If you make known your wants to us now we will be glad to send away for you, it giving us sufficient time. Therefore causing you no delay when you are ready.



Lawn and Garden Requisites

A Little Better
Quality—Save
the Difference.

**HOLDER
HARDWARE**

A Little Less
Price—Save
the Difference.

point. The display of garden tools is made in such a manner as to remind the novice just what tools he will need to make the garden and where he can get them.

The explanatory notes are only sufficient to assure the reader that a reliable strain of seeds, both flower and vegetable, can be secured.

it is customary to run the departmentized ad, showing illustrations of the articles offered and the prices at which they are sold.

This is an excellent practice and brings good results in almost all cases where it is in vogue. Many people do not come to the city at all until they are drawn by a sale on

STOP & SHOP

FRIDAY AND SATURDAY SPECIALS
OUR PRICES ARE NEVER HIGH

<p>BUKERS RED INJUN RAZOR This famous razor is sold in many places at \$1.00. Friday and Saturday, Special \$3.00</p>	<p>Get Ready for Oiling HOUSEHOLD SCALE</p> <p>Blue enamel frame, white enamel dial, 4-inch glass math; weighs 20 lbs. by ounces; tinned soap. Friday and Saturday, Special \$3.00</p>
<p>A YALE PADLOCK Size 2 1/2 inch, cast iron body, brass plate, steel shackle, warranted mechanism. A good, safe, lock. Friday and Saturday, Special 80¢</p>	<p>"AMERICAN SWATY" RAZOR HONE May be used dry or with water. Imparts a keen edge quickly. Size 5 inches by 2 1/2 inches. Friday and Saturday, Special 59¢</p>
<p>RIM CATCHES For screen and combination doors. Dull brass or antique copper finish. Friday and Saturday Special, each 50¢</p>	<p>BOY SCOUT LANTERNS Just the thing for camp and summer trip. Special 75¢</p>
<p>KANTREK KNIFE SHARPENER Rubber Mounted Home Edge Maker. Friday and Saturday Special 50¢</p>	

The Jennison Hardware Co.
NORTH OF WENONAH PARK
Madison 106 Deliveries to All Parts of City

every Saturday afternoon or evening for the week's supplies.

The accompanying reprint from the Bay City, Michigan, *Tribune* shows how the Jennison Hardware Company takes care of the Friday and Saturday special sales. The headline of the ad perhaps remains the same. The offerings are changed from week to week.

September Brings Cheerful Tone to Market—New Buying Developing—Buyers Gain Confidence.

Non-Ferrous Markets Showed Further Declines in Some Metals—Tin and Zinc Remain Firm.

WITH the arrival of September, a more cheerful tone has come to the markets.

Of chief significance has been the stiffening of some wholesale prices, the broadened demand in a number of lines, and the persistent strength of the stock market in the face of war rumbling abroad and an anthracite coal strike at home. With the news of the Japanese catastrophe and its staggering economic destruction, a new strain has been placed upon financial sentiment.

Copper.

Further declines in copper featured the nonferrous metal markets the past week.

Electrolytic copper sold down to 13.62½ cents delivered at the close of last week, as against 14 cents quoted at the beginning of the week.

Anxiety over the continued unsettled condition of the important European market, combined with a high rate of production attained earlier in the year to meet a peak domestic consumption and good foreign demand, have caused the pressure on the market. Consumers have been holding off all through the industry, pending prospects of a stable price. Fabricated copper and brass prices have not been reduced since August 23, but the reductions made at that time have not stimulated buying. Casting and lake copper and scrap prices have also declined in sympathy with electrolytic, which is the basic grade. The Japanese catastrophe may affect metals.

September 5 saw the copper market a little firmer.

Tin.

Tin has been strong, with a good volume of business done for account of tin plate makers for fourth quarter deliveries.

From March to July tin plate

makers held out of the market, and the price of Straits tin dropped from 50 cents to 37.50 cents; in recent weeks the leading interest has been a large buyer and subsequently independent mills also have been in the market. In consequence the world market has recovered substantially and the New York price has advanced from 40 cents to nearly 42 cents.

In the domestic market, September 4, practically all deliveries and positions of Straits and Straits shipments closed at from 41¾ to 41½ cents a pound, but the market was quiet.

Zinc.

Zinc was slightly easier, but with no great pressure from sellers, as a good foreign and domestic business has been done in August and production has been curtailed by labor troubles. In consequence prices ranged from 6.40 cents to 6.45 cents, East St. Louis, practically all week. September 6 the market was stronger at 6.50 cents. Brass special sold at 12½ to 15 points over prime western. High grade zinc has been selling at 8 cents to 8.50 cents delivered. Sheet zinc base price has been firm at 9.25 cents f. o. b. mill.

Purchases are again being made in this market for shipment abroad, which has materially strengthened the situation and the price has advanced to 6½ cents St. Louis, with the possibility of still higher quotations in the near future.

Lead.

The lead market is unchanged at from 6¾ to 7 cents New York, the price of the leading interest and the independents respectively, while the St. Louis market is still quotable at from 6.65 to 6.75 cents a pound.

The market has been extremely strong, due to a heavy buying movement by both consumers in the East

and Middle West, also to the curtailment in supplies the past month or two.

The American Smelting & Refining Company's advance to 6.75 cents New York, on August 27, was followed by further advances in the outside market, with sales at 6.65 cents East St. Louis and at 6.90 cents to 7 cents New York.

Solder.

Chicago warehouse prices on solder are as follows: Warranted 50-50, \$27.50; Commercial, 45-45, \$26.55, and Plumbers', \$25.50, all per 100 pounds.

Sheets.

Sometime during the present week the American Sheet & Tin Plate Company will announce prices for the fourth quarter.

Because it has such a large carry-over, however, it will be necessary again to allot tonnages to regular customers. It has less than two months' production of the last quarter to sell. It is possible there will be no change in price.

Pressure still is as heavy as ever upon it for tonnage of all kinds, and on certain grades it is heavier than for several weeks past.

Full-finished sheets for new models being put out by various automobile companies are in keen demand. Agricultural implement interests are actively specifying and requesting immediate shipment on blue annealed, galvanized and black sheets.

The jobber trade wants everything fromterne plate to common one-pass black sheets. Jobbers everywhere are seeking to replenish their stocks quickly.

Hot mills still are short of skilled men, rollers, heaters, doublers, etc., and this is limiting production to an average of 80 to 85 per cent of capacity.

Many of the independent mills are anxious to obtain black sheet business but there does not seem to be enough to go around, hence, some mills are offering concessions of about \$2 per ton to obtain tonnage backlogs. This makes a price of 3.75 cents, base Pittsburgh, against the regular 3.85 cents market level. Blue annealed is firm at 3.00 cents as is galvanized at 5.00 cents. Full-finished automobile sheets are unchanged at 5.35 cents, base Pittsburgh.

Tin Plate.

All of October and most of November's output of tin plate for one firm already is obligated in its carry-over; hence it will finish the year without fully discharging its obligations and without furnishing all the tin plate business presented to it by its regular customers. Some of the independents, too, are well obligated into the fourth quarter without having settled upon a price, but the general expectation is that the \$5.50 per base box of 100 pounds, Pittsburgh, figure will continue to prevail.

Because the filled-up state of the tin plate producers is generally well known, there is not much circulation of inquiries in the open market.

Tin plate consumers generally recognize the efforts to locate tonnages for prompt shipment are futile. Stock lists are limited and production plate, as indicated, is well obligated.

An oil interest is understood to have closed with a West Virginia independent on a fair sized tonnage and from time to time other consumers endeavor to increase their receipts by placing orders in addition to their contracts, having underestimated their full year's requirements.

Tin plate mill operation is somewhat better than in sheets, the general average being somewhere between 85 and 90 per cent.

Old Metals.

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, \$17.50 to \$18.00; old iron axles, \$26.00 to \$26.50; steel springs, \$19.50 to \$20.00; No.

1 wrought iron, \$15.50 to \$16.00; No. 1 cast, \$19.50 to \$20.00, all per net tons. Prices for non-ferrous metals are quoted as follows, per

pounds: Light copper, 9¼ cents; light brass, 5 cents; lead, 4¼ cents; zinc, 3½ cents; and cast aluminum, 15 cents.

Pig Iron Production Declines; Market in Buyers' Hands; Mills Open Last Quarter Books.

Stocks Increase at Pittsburgh—Chicago Market Improving—No. 2 Foundry \$24 at Birmingham.

"RELIEF for Japan has been the first concern of the steel trade," the *Iron Age* midweek review of the steel and iron industry says. "Even now the leading producers have before them good sized inquiries from Japanese importers representing expected needs in steel for emergency work. These houses were assured that all expedition would be given to shipment of relief material. The steel trade believes it will be months before the real construction demand from Japan will be felt. Time will be required to determine the character of permanent structures.

"In the domestic market the further cutting down of pig iron output in August has been of chief interest. Production for the month was 3,435,212 tons, or 110,316 tons a day, as against 3,673,334 tons in July, or 118,654 tons a day, a falling off of 6½ per cent."

Because so much pig iron now is available in Pittsburgh and the valley district, it is being estimated that around 350,000 tons are piled, buyers are maintaining an indifferent attitude. The market is in their hands. Prices are unchanged from a week ago and sales are spasmodic, involving for the most part small tonnages. Typical orders for foundry iron are single carloads up to 75 or 100 tons at a time.

Improvement continues in the Chicago pig iron market, though buying still lags and there is less than a real movement. Sales are largely spot and for September, though inquiry and selling for the fourth quarter are increasing. The opening of fall activity is expected to bring better business this month.

Some iron is being piled, but there

are only fair stocks on furnace yards, smelters' long term contracts ask full quotas for the fourth quarter. Few requests have been made to hold shipments.

The market is firmer at \$27, Chicago. Some makers quote a furnace price figuring slightly under this basis. Milwaukee melters are able to buy at \$27, Mayville or Milwaukee furnace.

Lower prices for pig iron have induced some buying in the Birmingham district. Quotations are at \$24 for No. 2 foundry. All furnace interests are participating in the business.

Sales in the past week aggregate somewhat better than they have for several weeks, but still are under production. The make has been reduced considerably.

Rogerts, Brown & Company report says:

"In a few districts the inquiry for pig iron the past week showed an improvement over the preceding week. It is very apparent that buyers are watching the pig iron market closely and those who have not already purchased must now be about ready to negotiate for their requirements for the remainder of this year.

"Iron produced in the East advanced 50 cents per ton. There was no change in the Central States. In the South the market ranges from \$23.50 to \$25.00 Birmingham.

The manner in which shipments are being ordered forward by foundries indicates their stocks are low and any appreciable increase in business would probably bring about some difficulty in arranging for shipments fast enough to take care of requirements."

Current Hardware and Metal Prices.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS

FIG IRON.

Chicago Foundry...	27 00 to 27 50
Southern Fdy. No. 2	29 51 to 30 01
Lake Sup. Char-coal	32 04
Malleable	27 00

FIRST QUALITY BRIGHT TIN PLATES.

	Per Box
IC 14x20 112 sheets	\$12 45
IX 14x20 " "	14 05
IXX 14x20 56 sheets	17 57
IXXX 14x20 " "	18 12
IXXXX 14x20 " "	18 65
IC 20x28 112 sheets	27 50
IX 20x28 " "	29 85
IXX 20x28 56 sheets	16 15
IXXX 20x28 " "	17 20
IXXXX 20x28 " "	18 25

TERNE PLATES.

	Per Box
IC 20x28, 40-lb. 112 sheets	\$25 60
IX 20x28, 40-lb. " "	28 50
IC 20x28, 30-lb. " "	21 80
IX 20x28, 30-lb. " "	24 70
IC 20x28, 25-lb. " "	20 80
IX 20x28, 25-lb. " "	23 70
IC 20x28, 20-lb. " "	18 30
IX 20x28, 20-lb. " "	21 15
IC 20x28, 15-lb. " "	17 05
IX 20x28, 15-lb. " "	19 75
IC 20x28, 8-lb. " "	14 05

COKE PLATES.

Cokes, 80 lbs., base, 20x28.	\$14 05
Cokes, 90 lbs., base, 20x28.	14 30
Cokes, 100 lbs., base, 20x28.	14 65
Cokes, 107 lbs., base, IC	
20x28	15 10
Cokes, 135 lbs., base, IX	
20x28	17 15
Cokes, 155 lbs., base, 56 sheets	9 30
Cokes, 175 lbs., base, 56 sheets	10 10
Cokes, 195 lbs., base, 56 sheets	10 95

BLUE ANNEALED SHEETS.

Base	per 100 lbs. \$4 00
------	---------------------

ONE PASS COLD ROLLED BLACK.

No. 18-20	per 100 lbs. \$5 00
No. 22-24	per 100 lbs. 5 05
No. 26	per 100 lbs. 5 10
No. 27	per 100 lbs. 5 15
No. 28	per 100 lbs. 5 20
No. 29	per 100 lbs. 5 30

GALVANIZED.

No. 16	per 100 lbs. \$5 60
No. 18-20	per 100 lbs. 5 75
No. 22-24	per 100 lbs. 5 90
No. 26	per 100 lbs. 6 05
No. 27	per 100 lbs. 6 20
No. 28	per 100 lbs. 6 35
No. 30	per 100 lbs. 6 55

BAR SOLDER.

Warranted.	
50-55	per 100 lbs. \$27 50
Commercial.	
45-55	per 100 lbs. 26 55
Plumbers	per 100 lbs. 25 50

ZINC.

In Slabs	6 75
----------	------

SHEET ZINC.

Cask lots, stock, 100 lbs.	11 00
Less than cask lots, 100 lbs.	11 50

BRASS.

Sheets, Chicago base	21 1/4c
Mill Base	18 1/4c
Tubing, brazed, base	26 1/4c
Wire, base	19c

COPPER.

Sheets, Chicago, base	22c
Mill Base	21 1/4c
Tubing, seamless, base	24c
Wire, No. 9 & 10 B. & S. Ga.	21 1/4c
Wire, No. 11 B. & S. Ga.	21 1/4c

LEAD.

American Pig	6 75
Bar	7 75

Sheet.	
Full Colls.	per 100 lbs. 10 25
Cut colls.	per 100 lbs. 11 25

TIN.

Pig Tin	per 100 lbs. 42 87 1/2
Bar Tin	per 100 lbs. 43 87 1/2

HARDWARE, SHEET METAL SUPPLIES, WARM AIR HEATER FITTINGS AND ACCESSORIES.

ADZES.

Coopers'.	
Barton's	Net
White's	Net

AMMUNITION.

Shells, Loaded, Peters.	
Loaded with Black Powder 18%	
Loaded with Smokeless Powder	18%
Winchester.	
Smokeless Repeater	20 & 4%
Grade	
Smokeless Leader	20 & 4%
Grade	
Black Powder	20 & 4%
U. M. C.	
Nitro Club	20 & 4%
Arrow	20 & 4%
New Club	20 & 4%
Gun Wads—per 1000.	
Winchester 7-8 gauge 10 & 7 1/4%	
" 9-10 gauge 10 & 7 1/4%	
" 11-28 gauge 10 & 7 1/4%	

ASBESTOS.

Paper up to 1/16	6c per lb.
Rollboard	6 1/4c per lb.
Millboard 3/32 to 1/4	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	\$8.00 per roll

AUGERS.

Boring Machine	40 & 10%
Carpenter's Nut	50%
Hollow.	
Stearns, No. 4, doz.	\$11 50
Post Hole.	
Iwan's Post Hole and Well	35%
Vaughan's, 4 to 9 in.	\$15 50

AXES.

First Quality, Single Bitted (unhanded, 3 to 4 lb., per doz.)	\$14 00
Good Quality, Single Bitted, same weight, per doz.	13 00

BARS, CROW.

Steel, 4 ft., 10 lb.	\$ 20
Steel, 5 ft., 18 lb.	1 40
Pinch bars.	
5 1/2 ft., 24 lb.	1 60

BARS, WRECKING.

V. & B. No. 12	\$0 34
V. & B. No. 24	0 43
V. & B. No. 32	0 57
V. & B. No. 38	0 48
V. & B. No. 330	0 63

BITS.

All Vaughan and Bushnell.	
Screw Driver, No. 30, each	\$ 27
Screw Driver, No. 1, each	16
Reamer, No. 80, each	41
Reamer, No. 100, each	41
Countersink, No. 13, each	20
Countersink, No. 14-15, each	27

BLADES, SAW.

Wood.	
Atkins 30-in.	
No. 1	40 26
No. 2	\$8 90 \$9 45 \$5 40

BLOCKS.

Wooden	45%
Patent	45%

BLOW TORCHES (See Firepots).

BOARDS.

	Per Doz.
Stove.	
Crystal, 33"	23 90
Wash.	
No. 760, Banner Globe (single)	per doz. \$5 25
No. 552, Banner Globe (single)	per doz. 6 75
No. 801, Brass King	per doz. 8 25
No. 860, Single-Plain Pump	6 25

BOLTS.

Carriage, Machine, etc.	
Carriage, cut thread, 1/4x6 and sizes smaller and shorter	45-5%
Carriage sizes, larger and smaller and shorter	40-5%
Machine, 1/4x4 and sizes smaller and shorter	50%
Machine, sizes larger and longer than 1/4x4	40-10%
Stove	70-5%

BRACES, RATCHET.

V. & B. No. 444 3 in.	\$4 54
V. & B. No. 222 3 in.	3 89
V. & B. No. 111 3 in.	3 55
V. & B. No. 11 3 in.	3 02

BRUSHES.

Hot Air Pipe Cleaning.	
Bristle, with handle, each	\$0 85
Flue Cleaning.	
Steel Only, each	\$1 25

BURRS.

Copper Burrs only	40%
-------------------	-----

BUTTS.

Steel, antique copper or dull brass finish—case lots—3 1/2x3 1/2—per dozen pairs	\$3 48
4x4	4 74

Heavy Bevel steel inside sets, case lots—	
per dozen sets	\$ 00
Steel bit keyed front door sets, each	2 00
Wrought brass bit keyed front door sets, each	4 00
Cylinder front door sets, each	5 50

CEMENT, FURNACE.

American Seal, 5 lb. cans, net	\$ 45
" 10 lb. cans, "	30
" 25 lb. cans, "	2 00
Asbestos, 5 lb. cans	45
Pecora	per 100 lbs. 7 51

CHAINS.

Sher. Steel Safety Chain.	
500-ft. coil, per ft.	.02
100 to 500 ft., per ft.	.02 1/2
Less than 100 ft., per ft.	.03
Iron Jack Chain.	
Box (12 yds.)	.45

CHIMNEY TOPS.

Iwan's Complete Rev. & Vent.	20%
Iwan's Iron Mountain only.	35%
Standard	30 to 40%

CHISELS.

Cold.	
V. & B. No. 25, 1/4 in., each	\$0 28
V. & B. No. 25, 1/2 in., each	41
Diamond Point.	
V. & B. No. 55, 1/4 in.	0 31
V. & B. No. 55, 1/2 in.	0 43

Firmer Bevelled	
Round Nose.	
V. & B. No. 65, 1/4 in.	0 29
V. & B. No. 65, 1/2 in.	0 40
Socket Firmer.	
Cape.	
V. & B. No. 50, 1/4 in.	0 21
V. & B. No. 50, 1/2 in.	0 57

CHUCKS, DRILL.

Goodell's, for Goodell's Screw Drivers	List less 35-40%
Yankee, for Yankee Screw Drivers	\$5 00

CLAMPS.

Adjustable.	
No. 100, Door (Stearns)	
doz.	\$22 00
Carpenters'.	
Steel Bar—List price plus 30%	
Hose.	
Sherman's brass, 1/4-inch	per doz. \$0 48
Double, brass, 1/4-inch, per doz.	1 20

CLINKER TONGS

Front Rank, each	\$1 75
Per doz.	1 85

CLIPS.

Damper.	
Acme, with tall pieces,	per doz. \$1 35
Non Rivet tall pieces,	per doz. 35

COPPERS—Soldering.

Pointed Roofing.

3 lb. and heavier	per lb. 40c
2 1/2 lb.	" 46c
2 lb.	" 48c
1 1/2 lb.	" 55c
1 lb.	" 60c

CORD.

No. 7 Std. per doz. banks	\$10 25
No. 8 " " "	12 00

CORNICE BRAKES.

Chicago Steel Bending.	
No. 1 to 6 B.	10%

COUPLINGS, HOSE.

Brass	per doz. \$2 25
-------	-----------------

CUT-OFFS

Kuehn's Korrekt Kutoffs:	
Galv. plain, round or cor. rd.	
Standard gauge	40%
26 gauge	10%

DAMPERS.

"Yankee" Hot Air.	
7 inch, each 20c, doz.	\$1 75
8 " " 25c, " "	2 40
9 " " 30c, " "	2 75
10 " " 32c, " "	3 00

Smoke Pipe.	
7 inch, each	\$ 35
8 " " "	40
9 " " "	50
10 " " "	60
12 " " "	90

Reversible Check.	
8 inch, each	\$1 50
9 " " "	1 70

DIGGERS.

Post Hole.	
Iwan's Split Handle (Bureka)	
4-ft. Handle	per doz. \$14 00
7-ft. Handle	per doz. 36 00
Iwan's Hercules pattern,	
per doz.	14 90

DRILLS.

V. & B. Star, 12-inch Length.	
1/4, 5/16 and 3/8, each	25
1/2, each	34
1, each	54
1 1/2, each	81
V. & B. Star, 18-inch Length.	
5/16 and 3/8, each	32
1/2, each	45
1, each	69
1 1/2, each	1 05

EAVES TROUGH.

Milcor	
Galv. Crimpedge, crated	70-5%

ELBOWS—Conductor Pipe.

Galv., plain or corrugated, round flat.	
Crimp, Std. gauge	60%
26 Gauge Std. gauge	40%
24 Gauge Std. gauge	10%

Square Corrugated.	
Milcor	
Standard gauge	45%
26 gauge	30%

Fortico Elbows.

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5%
Nested solid	70 & 5%

ELBOWS—Stove Pipe.

1-piece Corrugated. Uniform.	Doz.
6-inch	\$1 45
8-inch	1 60
7-inch	3 10
Special Corrugated.	
6-inch	\$1 45
7-inch	1 75

WHY do so many consumers know the merits of ARMCO-Ingot Iron?

This trade consciousness has been built up by Armco advertisements in national publications like the Saturday Evening Post with its 2,500,000 circulation and more than

twenty leading business papers, all carrying full-page advertisements. A Post ad is reproduced below.

The blue triangle, the trade-mark for ARMCO-Ingot Iron, is a trade builder. It not only helps the hardware merchant make sales but helps in resales.

Many times purer than steel

The freedom from impurities of a certain brand of iron means economy to every householder and every business man who knows the facts

A LITTLE sliver of wood is, by itself, a harmless thing. If, however, it is embedded in one's finger, blood poisoning may set in and the whole arm be corrupted.

In much the same way, foreign substances cause the decay of metal. When silicon, manganese, sulphur, phosphorus, carbon, or other impurities are contained in iron or steel, air and moisture single them out for attack. Electrolytic action starts, and corrosion sets in. Before long, rust has accomplished its work of destruction.



Micro-photograph showing difference between ordinary steel and Armco Ingot Iron

Ancient art and science

Only a short generation ago scientists discovered these facts about iron. Long years before, in our grandfather's day, wrought-iron nails and hinges were often so pure that they lasted a great many years. And articles of nearly pure iron have come down to us through many centuries lightly touched by the hand of time.

But making pure iron was an ancient art. In modern industries it was something nobody could do outside of a laboratory.

Twenty years ago we set ourselves the task of producing purified iron in commercial quantities. First came extended metallurgical research, then the devising of new mill practices where the metal was treated with great patience and care.



Coil of zinc-coated Armco Ingot Iron are economical because they endure

The iron that resists rust

Millions of dollars were invested in new mills; iron and coal mines were acquired. And today, ARMCO Ingot Iron, purer even than the ancient irons, is known and used all over the world. Much purer

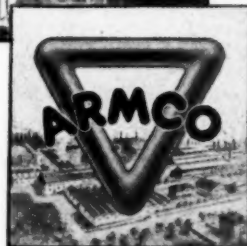
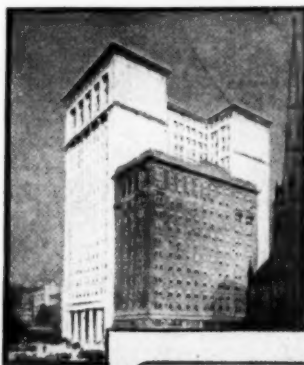
than steel, it contains less than 1-6 of 1 per cent of rust-promoting impurities. It has meant a tremendous saving in buildings, railroads, culverts, household equipment—in the various sheet metal installations that stand the test of exposure and time.

More than a barrier to rust

Resistance to rust is only one of the results that come from the purity of ARMCO Ingot Iron. It is soft and easily worked by sheet metal men, and has a dense, uniform surface.

These qualities make ARMCO Ingot Iron the perfect base for zinc coating, which is put on as an added protection—a first line of defense—against corrosion. The zinc coating (often called "galvanizing") unites in a smooth way with ARMCO Ingot Iron.

In the Cleveland Discount Building, the largest office building between New York and Chicago, the heating and ventilating systems are made of ARMCO Ingot Iron



More ARMCO Ingot Iron is probably used in zinc-coated sheets than in any other form. It is a great economy when used for such things as down spouting, gutters, refrigerator shelves, hot-water tanks, and ventilating ducts.

The beauty secret of enamel

The form in which women most appreciate ARMCO Ingot Iron is as a base for enameled table tops, stoves, refrigerators, and other household equipment. The smooth, velvety

surface of ARMCO Ingot Iron takes and holds a perfect coating of enamel.

Not only are great industries of all kinds aware of the merits of ARMCO Ingot Iron, but thousands upon thousands of men and women have learned how economical a thing it is for use in and outside of their homes. It costs but little more than steel and lasts much longer.

How you can identify it

Before the zinc-coated sheets leave our mills, each sheet that is up to our standard

WHERE TO LOOK FOR ARMCO Ingot Iron

Here are some of the everyday uses of ARMCO Ingot Iron

WITHIN THE HOUSE	IN INDUSTRY	IN BUILDING
Stoves	Welding	Coping
Washing Machines	Smoke Stacks	Roofing
Garbage Cans	Oil & Water Tanks	Siding
Ash Cans	Acetylene Tanks	Flashing
Pails	Freight Car Roofs	Eaves Trough
Refrigerators	Coal Car Sidings	Down Spouting
Furnace Drums	Drainage Systems	Skylights
Hot Water Tanks	Car Heaters	Ventilating Systems
Table Tops	Gasoline Tanks	Window Frames
Tub Covers	Coal Tipples	Metal Lath
Electric Light Reflectors	Wire Fencing	
	Metal Doors	
	Grave Vaults & Caskets	
	Fumes	
	Farm Equipment	
	Boiler Tubes & Pipes	
	Cold Rolled Strip	
	Cold Drawn Bars	
	Street Signs	
	Septic Tanks & Toilets	

ARMCO STEEL SHEETS

Armco chemists and metallurgists, working in one of the most complete laboratories of its kind in America, have developed not only Armco Ingot Iron, but also Armco steel sheet specialties for the automobile, electrical, and other industries. Leading automobile manufacturers use Armco steel sheets on account of their exceptional bending and drawing qualities. Armco steel electrical sheets are widely used because of their high permeability, low core loss, and non-aging qualities. The American Rolling Mill Company are makers of high-grade special sheets to meet the demands of exacting manufacturers. Technical information will be supplied to any manufacturer as to Armco products and their adaptability to any particular need.



When Armco Ingot Iron is used as a base for enameling, modern household equipment is seen at its very best

is stenciled with the blue Armco triangle. Architects and sheet metal workers know this brand. They will readily co-operate with you in getting ARMCO Ingot Iron for any building operation.

In buying household articles made of sheet iron you should always look for the blue and gold Armco label. Manufacturers who use so fine a metal are glad to have you know it, and they mark their product with this label.

It is well worth your while to ask for and to identify ARMCO Ingot Iron when buying anything made of sheet metal.



THE AMERICAN ROLLING MILL COMPANY
Middletown, Ohio

ARMCO
TRADE MARK
INGOT IRON
Resists Rust

Uniform, Collar Adjustable.	
6-inch	Doz. \$2 00
8-inch	Doz. 2 10
7-inch	Doz. 2 60

WOOD FACES—50% off list.

FENCE.	
Field Fence	60%
Lawn	53%

FILES AND RASPS.	
Heller's (American)	65-5%
American	65-5%
Arcade	60 & 10%
Black Diamond	60-5%
Eagle	60-10%
Great Western	60 & 10%
Kearney & Foot	60 & 10%
McClellan	60 & 10%
Nicholson	60-14%
Simonds	60%

FIRE POTS.

Ashton Mfg. Co.	
Complete line	
Firepots and Torches	52%
Otto Bernz Co.	
No. 1 Furn. Gasoline with large shield, 1 gal.	\$ 6 75
No. 2 Furn. Kerosene, 1 gal.	15 12
No. 10 Brazier, Kerosene or Gasoline, 10 gals.	47 52
No. 5 Torch, Gasoline or Kerosene, 1 pt.	7 92
No. 23 Torch, Gasoline, 1 quart.	5 40
No. 26 Torch, Gasoline, 1 pt.	4 05
Clayton & Lambert's.	
East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Arizona, San Angelo and Laredo, Texas	48%
West of above boundary line	48%
Geo. W. Diener Mfg. Co.	
No. 02 Gasoline Torch, 1 qt.	\$ 5 55
No. 0250, Kerosene or Gasoline Torch, 1 qt.	7 50
No. 10 Tinner's Furn.	12 40
No. 15 Tinner's Furn.	12 00
Round tank, 1 gal.	12 00
No. 21 Gas Soldering Furnace	3 60
No. 110 Automatic Gas Soldering Furnace	10 50
Double Blast Mfg. Co.	
Gasoline, Nos. 25 and 35	60%
Quick Meal Stove Co.	
Vesuvius, F.O.B. St. Louis	30%
(Extra Dist. for large quantities)	
Chas. A. Hones, Inc.	
Buzzer No. 1	\$ 9 00
" " 2	12 00
" " 22	12 50
" " 42	15 00
" " 43	19 00

FREEZERS—ICE CREAM.

Peerless and Alaska	
1 quart	\$2 95
2 quart	3 45
3 quart	4 10
White Mountain	
1 quart	\$2 50
2 quart	4 00
3 quart	5 70

GALVANIZED WARE.

Pails (Competition), 8-qt.	\$1 35
10-qt.	2 25
12-qt.	2 50
14-qt.	2 75
Wash tubs, No. 1	\$6 75
No. 2	7 00
No. 3	8 25

GARAGE DOOR HARDWARE.

Stanley	All net
GAUGES.	
Marking, Mortise, etc.	Nets
Wire.	
Disston's	25%

GIMLETS.

Discount	65% and 10%
----------	-------------

GLASS.

Single Strength, A and B.	all sizes 83 & 85%
Double Strength, A, all sizes	84%

GREASE, AXLE.

Fraser's	
1-lb. tins, 36 to case.	per case \$ 4 70
3-lb. tins, 36 to case.	per case 7 30
5-lb. tins, 12 to case.	per case 7 30
10-lb. tins, per dozen	10 40
15-lb. tins, per dozen	12 80
25-lb. tins, per dozen	19 80

HAMMERS, HANDLED.

All V. and B.	
Each, net	
Blacksmith's Hand, No. 0, 26-oz.	\$1 00
Engineers' No. 1, 26-oz.	1 00
Farrier's, No. 7, 7-oz.	93
Machinists', No. 1, 7-oz.	78
Nail.	
Vanadium, No. 41, 26-oz.	each 1 45
Vanadium, No. 41½, 16-oz.	each 1 45
V. & B., No. 11½, 16-oz.	each 1 04
Garden City, No. 11½, 16-oz., each	87
Tinner's Riveting, No. 1, 8-oz., each	82
Shoe, Steel, No. 1, 18-oz., each	65
Tack.	
Magnetic, No. 5, 4-oz., each	72

HAMMERS, HEAVY.

Farrier's	20%
Mason's	20%
Single and Double Face	50%

HANDLES.

Axe.	
Hickory, No. 1	per doz. 4 00
Hickory, No. 2	3 00
1st quality, second growth	6 00
Special white, 2nd growth	5 00
Chisel.	
Hickory, Tanged, Firmer	Assorted per doz. 55c
Hickory, Socket, Firmer	Assorted per doz. 70c
File	per doz. \$1 20
Hammer and Hatchet.	
No. 1 per doz.	\$0 90
Second growth hickory.	per doz. 1 50
Soldering.	
Per doz.	\$2 40

HANGERS.

Conductor Pipe.	
Milcor Perfection Wire	25%
Eaves Trough.	
Steel hangers	30%
Triple Twist wire	10%
Milcor Triples Wire	10%
Milcor Milwaukee Extension	15%
Milcor Steel (galv. after forming) List plus	12½%
Milcor Selflock E. T. Wire.	List plus 40%

HASPS.

Hinge, Wrought, with staples, Net	
-----------------------------------	--

HATCHETS.

V. and B. Supersteel.	
Each	
Broad, No. 1, 24-oz.	\$1 43
Half, No. 1, 15-oz.	1 25
Half, No. 2, 17-oz.	1 37
Claw, No. 1, 19-oz.	1 21
Flooring, No. 1, 20-oz.	1 43
Shingling, No. 1, 17-oz.	1 20
Lathing, No. 1, 14-oz.	1 20
Lathing, No. 2, 17-oz.	1 25

Vanadium Steel.	
Half, No. 62, 22-oz.	\$1 82
Underhill Pattern Lathing.	9 row, 19-oz. 2 20

HINGES.

Heavy Strap, in Bundles.	
4 inch, dozen prs.	\$1 12
5 " " "	1 57
6 " " "	1 93
8 " " "	3 21
Extra Heavy T in Bundles.	
4 inch, dozen prs.	\$1 74
5 " " "	1 85
6 " " "	2 31
8 " " "	3 9

HOES.

Garden	Net
--------	-----

HOOKS.

Box.	
V. and B. No. 3, each	\$0 26
Conductor.	
Milcor	
"Direct Drive" Wrought Iron for wood or brick	15%
Cotton.	
V. and B. No. 2, each	24
Hay.	
V. and B. No. 1, each	36

Bar Meat.

V. and B. No. 26, ¼".	each 09
V. and B. No. 28, ¼".	each 16
Screw Meat.	
V. and B. No. 2, per gro.	6 50
Butchers' "S."	
V. and B. No. 6, each	05
V. and B. No. 8, each	11

ROSE.

Per Ft.	
¼-in. 2 ply molded	¾c to 12¼c
¼-in. cord	¾c to 10c
¼-in. wrapped	13¼c

HUMIDIFIERS.

"Front-Range" Automatic.	
In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

IRONS.

Sad.	
Genuine Mrs. Potts, nickel plated, per set	\$1 55
Asbestos No. 70, per set	2 10
Asbestos No. 100, per set	2 30
E. C. Stearns.	
No. OA Corner, doz. sets	\$2 50
No. OB	2 75

KNIVES.

Butcher.	
Beechwood Handles, 6-inch blade	25%
Beechwood Handles, 7-inch blade	25%
Beechwood Handles, 8-inch blade	25%
Cooper's Hoop	25%
Drawing.	
Standard	25%
Adjustable	25%
Barton's Carpenters	25%
Hay.	
Iwan's Solid Socket	25%
Heath's	25%
Iwan's Sickle Edge	25%
Iwan's Imp'd Serrated	25%
Hedge.	
Challenge	25%
Disston's No. 1	25%
Putty.	
Common	25%
Lander's	25%
Scraping.	
Beech Handles	25%
Lander's	25%

KNOBS.

Door.	
Mineral	per doz. \$2 00
Porcelain	2 00
Jet	2 00

LADDERS.

Step.	
Common, per ft.	35c
Common, with Shelf, add 10c	
IXL	34c
Challenge, 6 to 9 ft.	55c
10 to 16 ft.	60c
Kant-Break, per lineal ft.	75c

LANTERNS.

Per doz.	
Monarch tin, hot blast	\$ 8 25
Diets No. 2, cold blast	12 00
Best tubular	8 25
Competition lanterns No. 6 tubular	6 90

LAWN MOWERS.

12-inch	\$5 20
16-inch	5 35
Ball Bearing.	
4 blade, adjustable bearing.	
14"	\$7 50
16"	7 30

LEATHER BELTING.

From No. 1 Oak Tanned Butts.	
Extra heavy, 18-oz.	35%
Heavy, 16-oz.	40%
Medium, 14½-oz.	40%
Light, 12-oz.	50%

LEATHER LACING.

Cut, strictly No. 1	45%
---------------------	-----

LEVELS.

Disston, No. 28 Asst.	\$22 05
" No. 18, 20 in., each	1 80
" No. 22, 24 in., each	2 40
" Shafting, 6 in.	19 80
" 6 in. gr. glass	24 20
" No. 1 Asst.	5 75
" No. 2 Asst.	12 40
" 24-26 in., each	1 02
" 28-30 in., each	1 00

LIFTERS.

Stove Cover.	
Coppered	per sq. ft. \$4 00
Alaska	4 75

LOCKS.

Barn Door.	
No. 60 Stearns'.	per doz. \$11 00
No. 80	20 00

MALLETS.

Carpenters'.	
Fibre Head No. 2, per doz.	\$12 00
" No. 3,	15 50
" No. 2½,	20 50
Round Hickory	
per doz.	\$3 00—5 00
Tinner's.	
Hickory	per doz. \$2 25

MATS.

Door.	
National Rigid	5 & 10 & 5%
Acme Steel Flexible	50%

MITRES.

Galvanized steel mitres, and caps, end pieces, outlets	20%
Milcor	
Galv. one piece stamped	40%

MOPS.

Cotton, Star (Cut Ends).	
Pounds 12' 15' 18' 24'-3-oz.	
Per doz. \$4 00 4 35 5 50 7 00	
Enterprise	14½%
Parker	50 & 5%

NAILS.

Cut Steel	\$4 70
Cut Iron	4 70
Wire.	
Common	3 80
Cement Coated	3 40

NETTING, POULTRY.

Galvanized before weaving	45-10%
Galvanized after weaving	45%

NIPPERS.

Nail Cutting.	
V. & B. No. 30	75c
Double Duty.	
V. & B. No. 60	76c

Hoof.	
Heller's	40 & 10%
V. & B. No. 52, each	\$2 25

NOZZLES.

Hose.	
Magic	per doz. \$9 50
Diamond	5 75

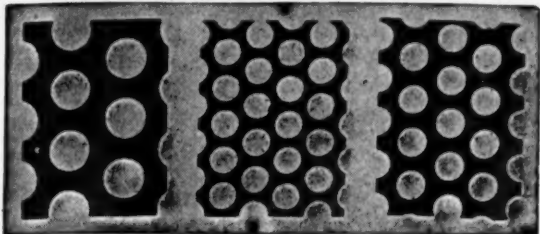
OILERS.

Chase Pattern.	
Brass and Copper	10%
Zinc Plated	40 & 5%
Railroad.	
Brass	20 & 5%
Coppered	50 & 5%
Steel.	
Copper Plated	70 & 5%

OPENERS.

Delmonico	
per doz.	\$1 30
Never Slip	65
Crute.	
V. & B. per doz.	\$7 25—11 00

PERFORATED METALS



All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.
For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATED METAL

THE HARRINGTON & KING PERFORATING CO.

610 NORTH UNION ST.—CHICAGO, ILL. U. S. A.
NEW YORK OFFICE, 114 LIBERTY ST.

H O O K S

ALL KINDS—ALL SIZES
FOR BRICK OR WOOD

BERGER HOOKS are widely used throughout the trade. They are made of the best malleable iron and are high grade in every respect.

Try some on your next job.

We can also furnish **SOLID BRASS HOOKS.**

Write for catalog showing complete line

BERGER BROS. CO.

229 to 237 Arch Street, PHILADELPHIA, PA.

Warerooms and Factory: 100 to 114 Broad Street



Memorial Monuments

Write for Prices and
Illustrations

Gerock Bros. Mfg. Co.

Sheet Metal Ornaments
and
STATUARY

1252 So. Vandeventer Ave.

St. Louis, Mo., U. S. A.



KESTER
Solder
REQUIRES ONLY HEAT
Sample for Test
Upon Request

CHICAGO SOLDER COMPANY
4201 Wrightwood Ave., CHICAGO, ILL.

CORTRIGHT METAL SHINGLE

Why Hand-dipped Shingles Last Longer

Hand-dipped shingles are first formed out of prime roofing tin, and then dipped in molten zinc. A uniform coating adheres to both sides and all edges.

We also make shingles of tight-coated galvanized sheets and of tin. The latter we paint either red or green.

CORTRIGHT
Philadelphia

METAL ROOFING CO.
Chicago

STANDARD

SINCE 1887



The Best Eaves Trough
Miter in the
World

Ask
your Jobber for
CHAMPION MITERS & ENDS
—all Dependable Products—

CHAMPION
PRODUCTS

BRADEN MFG. CO. TERRE HAUTE
INDIANA

FAILS.		
Cream.		
14-qt. without gauge.	per doz.	\$9 50
18-qt. without gauge.	per doz.	11 00
20-qt. without gauge.	per doz.	11 75

Sap.		
10-qt. IC Tin	per doz.	\$4 00
12-qt. " "	"	5 50

Stock.		
Galv. qts. 14 16 18 20		
Per doz.	\$9 75 10 75 12 75 14 50	

Water.		
Galvanized qts. 10 12 14		
Per doz.	\$5 75 6 50 7 25	

PASTE		
Asbestos Dry Paste:		
200-lb. barrel		\$15 00
100-lb. barrel		8 00
35-lb. pail		3 25
10-lb. bag		1 00
5-lb. bag		55
2½-lb. cartons		30

PINCERS.		
All V. & B.		
Carpenters', cast steel.		
No. 6 8 10 12		
Each	\$0 43 \$0 52 \$0 61 \$0 71	
Blacksmiths', No. 10.		\$0 64

PIPE.		
Conductor.		
"Interlock" Galvanized.		
Crated and nested (all gauges)		\$0-7½%
Crated and not nested (all gauges)		\$0-2½%
Square Corrugated A and B and Octagon.		
25 Gauge		\$0-10%
28 "		\$0-10%
26 "		\$0-10%
24 "		\$0-10%

"Interlock."		
Crated and nested (all gauges)		\$0-7½%
Prices for Galvanized Toncan Metal, Genuine O. H. Iron, Lyonmere Metal and Keystone C. B. on application.		

Stove.		
Per 100 joints.		
26 gauge, 5 inch E. C.		
nested		\$16 00
26 gauge, 6 inch E. C.		
nested		17 00
26 gauge, 7 inch E. C.		
nested		19 00
28 gauge, 5 inch E. C.		
nested		14 00
28 gauge, 6 inch E. C.		
nested		15 00
28 gauge, 7 inch E. C.		
nested		17 00
30 gauge, 5 inch E. C.		
nested		12 00
30 gauge, 6 inch E. C.		
nested		14 00
30 gauge, 7 inch E. C.		
nested		15 00
T-Joint Made up.		
6-inch	per 100	\$40 00

Furnace Pipe.		
Double Wall Pipe and Fittings		33½%
Single Wrt'l Pipe, Round Pipe Fittings		33½%
Galvanized and Back Iron Pipe, Shoes, etc.		33½%
Milcor. Galvanized		40%

PLANES.		
Stanley Iron Bench		Net

PLIERS.		
(V. & B.)		
Nut, No. 2, each		\$2 50
" No. 5, each		64
" No. 25, each		69
Gas, No. 7, each		55
" No. 8, each		61
" No. 12, each		87

Lining or Crimping.		
No. 35, each		64
Button's Pattern.		
No. 6 each		61
No. 8 each		74
Double Duty, No. 106		50

POINTS, GLAZIERS.		
No. 1, 2 and 3	per doz. pkgs.	65c

POKERS, STOVE.		
Wrt'l Steel, str't or bent.		
Nickel Plated, coil	per doz.	\$9 75
sandles	"	1 10

POKERS, FURNACE.		
Each		\$9 50

FULLERS.		
Furnace Tackle	per doz.	\$0 60
Per gross		6 00
" Screw (en-cased)	per doz.	\$0 85
Ventilating Register.		
Per gross		\$9 00
Small, per pair		0 30
Large, per pair		0 50

PUNCHES.		
Machine.		
V. & B., No. 11-12, 1½x6		\$0 19
V. & B., No. 90, ¾x9		27
V. & B., No. 10, ¾x10		29
V. & B., No. 1-6, ½x6		12

Center.		
V. & B., No. 50, ¾x4		\$0 14
Belt.		
V. & B., No. 101-102		\$0 24
V. & B., No. 103-109		33
V. & B., No. 25, ass't.		3 80

Samson Line.		
No. 1 Hand	Doz. lots or less	40%
No. 2 Hand	3 doz. lots	40%
No. 4 Hand	6 doz. lots or more	Less 50%
No. 3 Bench	Less than doz. lots	25%
	Doz. lots or more	Less 40%

Extra Punches and Dies for Samson:		
No. 1 Hand	Less than doz. lots	25%
No. 2 Hand	Doz. lots	40%
No. 4 Hand	3 doz. lots	40%
No. 3 Bench	6 doz. lots or more	Less 40 & 10%

PUTTY.		
Commercial Putty, 100-lb. kits		\$2 55

QUADREANTS.		
Malleable Iron Damper		10%

RAZORS—SAFETY.		
Gillette	per doz.	\$45 00
Auto Strop	"	45 00
Gem	"	8 40
Gem (3 doz. lots)	"	3 00
Every Ready	"	2 40
Ever Ready (3 dz. lots)	"	8 00

RAZORS STRAIGHT.		
Star (Honing)		50%

RAZOR STROPS.		
Star (Honing)		50%

FLOOR REGISTERS AND BORDERS.		
Cast Iron		20%
Steel and Semi-Steel		33½%
Baseboard		33½%
Adjustable Ceiling Ventilators		33½%

Register Faces—Cast and Steel		
Japanned, Bronzed and Plated.		
4x6 to 14x14		33½%
Large Register Faces—Cast.		
14x14 to 38x42		60%
Large Register Faces—Steel.		
14x14 to 38x42		65%

ROOFING.		
Per Square		
Best grade, slate surf. prep'd	\$1 85	
Best talc surfaced	2 20	
Medium talc surfaced	1 50	
Light talc surfaced	95	
Red Rosin Sheeting, per ton	\$72 00	

COTTON.		
Shawl.		
1st Quality, base 14½c to 16½c		
No. 2		13½c to 15c
Manila.		
1st Quality standard brands		13½c to 20½c
No. 2		17c to 18½c
Hardware Grade, per lb.		17½c

SAWS.		
Butchers'.		
Atkins No. 2, 14-in.		\$12 75
" No. 2, 18-in.		14 30
" No. 7, 16-in.		15 85
" No. 2, 22-in.		15 92
" No. 7, 20-in.		18 05
" No. 7, 24-in.		20 20
" No. 7, 28-in.		22 35

Compass.		
Atkins No. 2, 10-in.		\$ 5 45
" No. 10, 10-in.		5 60
" Blades, No. 2, 10-in.		3 25
" " No. 2, 10-in.		3 30

Cross-Cut.		
Atkins No. 221, 4 ft.		\$3 03
" No. 221, 6-ft.		4 45
" No. 221, 8-ft.		6 07

Hand.		
Copper Burrs only		30%
" No. 96, 20-in.		21 70

Hand and Rip.		
Atkins No. 54, 20-in.		\$19 50
" No. 54, 26-in.		24 40
" No. 53, 16-in.		18 10
" No. 53, 20-in.		22 90
" No. 53, 24-in.		26 60
" No. 53, 28-in.		31 45
" No. 53, 30-in.		34 15

Keyhole.		
Atkins No. 1, complete		\$3 10
" No. 2, complete		3 70

Miter Box.		
Atkins No. 1, 4x20		\$32 85
" No. 1, 5x22		33 00
" No. 1, 6x22		42 20

Fruing.		
Atkins No. 20, 12-in.		\$ 8 45
" No. 10, 16-in.		18 15

Wood.		
Atkins No. 202		\$ 7 19
" No. 318		8 75
" No. 906		15 50
" No. 1509		16 56

SCRAPERS.		
Box.		
No. 6, six blades each		25c
Hog.		
No. 6, each		25c
Floor (Stearns).		
No. 10, each		\$11 50

SCREEN DOOR HINGES.		
Cast Iron	gross	\$12 00
Steel	"	9 50

SCREWS.		
Wood.		
F. H. Bright		80%
R. H. Blued		78%
F. H. Jap'd		74%
F. H. Brass		76%
R. H. Brass		74%

Sheet Metal.		
No. 7, ¼x ¼, per gross		\$0 55
No. 10, ¼x3/16, per gross		75
No. 14, ¼x ¼, per gross		90

SCREW DRIVERS.		
Uncle Sam Standard Head.		
3 inches, each		\$ 45
5 inches, each		53
8 inches, each		63
12 inches, each		1 02

Uncle Sam Insulated Head.		
3 inches, each		\$ 49
5 inches, each		57
8 inches, each		76
12 inches, each		1 14

SETS.		
Nail.		
V. & B.		
No. 100, in cardboard boxes	per doz.	\$1 45
No. 100, in wooden boxes		1 45
No. 30, assorted	per doz.	39
No. 5, in cardboard boxes	per doz.	1 25
No. 5, in wooden boxes	per doz.	1 25

Rivet.		
V. & B.		
Farmers'		\$0 15
Tinners' 3-4		0 40
" 00-0		0 40
Saw.		
Atkins No. 10	per doz.	\$5 50
" No. 12	"	6 30

SHEARS.		
Per Doz.		
Nickel Plated, Straight		\$12 99
" " "		14 85
" " "		16 80
Japanned, Straight		11 00
" " "		12 40
" " "		13 80

SHEARS, TINNERS' & MACHINISTS.		
Viking		\$32 40
Lennox Throatless.		35%
No. 18		35%
Shear blades		10%
(f.o.b. Marshalltown, Iowa.)		
Peerless Steel Squaring.		
Foot Power.		
No. 1-30", 18 ga. cap.		15%
No. 2-36", 18 ga. cap.		15%
No. 4-52", 18 ga. cap.		15%
No. 10-120", 22 ga. cap.		15%
No. 4A-52", 16 ga. cap.		15%
Cast Iron Foot Power.		
No. 01, 30", 18 ga. cap.		15%
Power Driven.		
(No. 100 Series, 2 Shaft Drive.)		
No. 142-42", 18 ga. cap.		15%
(No. 200 Series, 2 Shaft Underneath Drive.)		
No. 242-42", 14 ga. cap.		15%
(No. 300 Series, 3 Shaft Underneath Drive.)		
No. 342-42", 10 ga. cap.		15%
No. 372-72", 10 ga. cap.		15%
(No. 500 Series, 3 Shaft Underneath Drive.)		
No. 596-96", 10 ga. cap.		15%
(No. 600 Series, 3 Shaft Underneath Drive.)		
No. 6120-120", 3/16" cap.		15%

SHINGLES.		
Per Square		
Zinc (Illinois)		\$18 00

SHOES.		
Milcor.		
Galv. Std. Gauge, Plain or corg. round flat crimp		60%
26 gauge round flat crimp		40%
24 gauge round flat crimp		10%
Conductor		60%

SHOVELS AND SPADES.		
Coal.		
Hubbard's.		
No. A B C D		
1	\$16 60 15 10 14 45 13 79	
2	18 35 16 60 14 85 14 19	
3	18 75 16 09 16 25 14 45	
4	17 10 16 35 16 60 14 35	

Post Drains & Ditching.		
Hubbard's.		
Size A B C		
14"	\$17 15 \$16 40 \$15 65	
16"	17 50 16 75 16 00	
18"	17 85 17 10 16 35	
20"	18 20 17 45 16 70	
22"	18 55 17 80 17 05	
Alaska Steel.		
D-Handle	per doz.	\$3 50
Long Handle	"	3 00

SIFTERS.		
Genuine Hunters, doz.		\$2 50

ART METAL CEILINGS AND SIDE WALLS

QUALITY—DURABILITY—BEAUTY

Are thoroughly combined in **FRIEDLEY-VOSHARDT ART METAL CEILINGS AND SIDE WALLS**. We have added to our list a great number of new and handsome designs. Special designs can be made if desired. Only the **best** of materials used. We are prepared to serve **you**. Ceiling Catalog No. 33 on request.

DONT DELAY—WRITE TODAY

FRIEDLEY-VOSHARDT CO.

Office: **733-737 S. Halsted St.** Factory: **761-771 Mather Street**
CHICAGO, ILLINOIS

WIRE

electrical, rope, barbed, plain, nails, tacks, spikes, bale-ties, hoops, springs, netting, wire fences, steel posts, steel gates, trolley wire, rail bonds, flat wire (strip steel), piano wire, horse shoes, round and odd-shape wire, screw stock, concrete reinforcement. Aerial Tramways.

Illustrated Books describing uses, **FREE**

American Steel & Wire Company
Chicago—New York

Terne Plate Specialists

since the beginning of the industry in this country

Let us quote on your requirements.

THE J. M. & L. A. OSBORN COMPANY, Cleveland
Sheet Metal Workers' and Furnacemen's Supplies

AREX

These advertisements sell your work. Arex advertising is buying large sales every day—more men to know Arex superiority. Supply these better ventilators in your next job—you make a larger profit and build a reputation. Write for sample ads and the latest Arex catalog.

AREX COMPANY

J. C. Kernchen, Pres.
1581 Conway Building, Chicago

THE ORIGINAL SIPHONAGE VENTILATOR

CHICAGO STEEL CORNICE BRAKES STANDARD OF THE WORLD



THE BEST BRAKE FOR ALL PURPOSES
Most Durable, Easiest Operated, Low in Price
Made in All Lengths and to Bend All Gauges of Metal. Over 15,000 in use.

WRITE FOR PARTICULARS

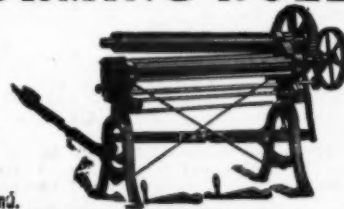
DREIS & KRUMP MFG. CO., 2915 S. Halsted Street, CHICAGO

50-INCH FORMING ROLL

This Forming Roll is built in all standard sizes, with our Patented Opening Device by means of which it is opened and closed in a few seconds.

We build a complete line of Shears and Punches, all sizes, for hand or belt power
Write for Catalog "R"

BERTSCH & CO., Cambridge City, Ind.



C. G. HUSSEY & CO.

Rolling Mills and Office, **PITTSBURGH, PA.**

Manufacturers of

SHEET COPPER, BOTTOMS, ROLL COPPER, TINNED AND POLISHED COPPER, NAILS, SPIKES, RIVETS, CONDUCTOR PIPE, EAVES TROUGH, ELBOWS, SHOES, MITRES, ETC.

Branch Warehouses in New York, Chicago and St. Louis

Plecker's Galvanized Eave Trough and Corrugated Expanding Conductors

Made of
Keystone
Copper Bearing
Steel



Cost no more
Lasts longer
Therefore
Cheapest

CLARK-SMITH HARDWARE CO. - PEORIA, ILLINOIS

"THE STANDARD" VENTILATOR and CHIMNEY CAP

DOES away with high stacks, swings freely in the slightest breeze and positively cures down-drafts. The strongest and most efficient combination to be had. Has no equal for chimney purposes. All jobbers sell them—write your jobber or us for prices and catalog today.

Manufactured by
STANDARD VENTILATOR CO.
LEWISBURG, PA.



SNIPS, TINNERS'.	
Clever Leaf	40 & 10%
National	40 & 10%
Star	50%
Milcor	Net

SQUARES.	
Steel and Iron	Net
(Add for binning, \$3.00 per doz. net)	
Mitre	"
Try	"
Try and Bevel	"
Try and Mitre	"
Fox's	per doz. \$6 00
Winterbottom's	10%

STAPLES.	
Blind	"
Barbed	per lb. 21 @ 22c
Butter, Tub	" 14 @ 15c
Fence—	
Polished	per 100 lbs. \$5 45
Galvanized	" 6 15
Netting	"
Galvanized	per 100 lbs. \$6 54
Wrought.	
Wrought Staples, Hasps and	
Staples, Hasps, Hooks and	
Staples, and Hooks and	
Staples	50 & 10%
Extra heavy	25%

STONES.	
Axe.	
Indostan	per lb. New Nets
More Grite	"
Washita	"
Emery.	
No. 126	per doz. New Nets
Oil—Mounted.	
Arkansas Hard	
No. 7	per doz. New Nets
Arkansas Soft.	"
Washita No. 717	"
Oil—Unmounted.	
Arkansas Hard per lb. New Nets	
Arkansas Soft.	"
Lilly White	"
Queer Creek	"
Washita	"

Serthe.	
Black Diamond per gro. New Nets	
Crescent	"
Green Mountain	"
LaMolle	"
Extra Quinne-	
bog	"
Red End	"

STOPS, BENCH.	
No. 10 Morrill pat-	
tern	per doz. \$11 00
No. 11 Stearns pat-	
tern	10 00
No. 15 Smith pat-	
tern	7 00

STOPPERS, FLUE.	
Common	per doz. \$1 10
Gem. No. 1	" 1 10
Gem. flat, No. 3	" 1 00

STRETCHERS.	
Carpet.	
Bullard's	per doz. \$3 90
Excelior	" 5 25
Malleable Iron	" 70
Perfection	" 6 30
King	" 4 50
Wire.	
O. S. Elwood, No. 1 per doz. Nets	
O. S. Elwood, No. 2	"

SWIVELS.	
Malleable Iron	per lb. \$0 10
Wrought Steel	per gro. 4 50

TACKS.	
Bill Posters' 6-oz. 25-lb. boxes	
per lb.	15c
Upheaters' 6-oz. 25-lb.	
boxes, per lb.	15 1/2c

TAPES, MEASURING.	
Asses' Skin	List & 40%

THERMOMETERS	
Tin Case	per doz. \$00 & \$1 25
Wood Backs	" \$2 00 & 12 00
Glass	" 12 00

TIES.	
Bals.	
Single Loop, carload	
lots	75 & 7%
Single Loop, less than	
car lots	70 & 15%

TRAPS.	
Mouse and Rat.	Per Gross.
Sure Catch Mouse Traps.	\$ 2 10
Vim Mouse Traps	3 10
Short Stop Mouse Traps.	1 30
Wood Choker Mouse	
Traps, 4 hole	10 25

Per Doz.	
Sure Catch Rat Traps	\$0 50
Dead Easy Rat Traps	1 00
Baskets.	
Packed in One Bushel Band Stave	
List per Bushel.	
Sure Catch Mouse Traps	
(300 Traps)	\$ 5 25
Short Stop Mouse Traps	
(300 Traps)	4 50
Sure Catch Rat Traps (54	
Traps)	3 60
Short Stop Rat Traps (54	
Traps)	3 15

Assorted Mouse and Rat Traps.	
List per Bushel.	
Sure Catch (216 Mouse	
Traps and 36 Rat Traps) \$4 00	
Short Stop (216 Mouse	
Traps and 36 Rat Traps) 4 25	

TROWELS.	
Cement.	
Atkins No. 6	\$19 50
No. 9	25 50

TWINE.	
White Cotton.	
Eureka, 4-ply	per lb. 30c
Jute.	
3-ply and 6-ply Bale Lots	22 1/2c

VALLEY.	
Milcor	
Galv. formed or roll	50-7 1/2%

VENTILATORS.	
Standard	30 to 40%

VISES.	
No. 700 Hand.	
Inches	4 1/2 5 5 1/2
Doz.	\$11 15 13 00 14 35
No. 701	In. 4 5 6
Doz.	\$11 15 13 00 16 70
No. 1. Genuine Wentworth.	
Noiseless Saw	per doz. 9 25
No. 3. Genuine Wentworth.	
Noiseless Saw	per doz. 12 75
No. 500. All Steel Folding	
Saw	per doz. 16 00

WASHERS.	
Over 1/2 in. barrel lots	
per 100 lbs.	\$6 25
Iron and Steel.	
In. 5/16 3/4 1 1/4 1 3/4 2	
10 1/2c 9 1/2c 7 1/2c 7 1/2c 7 1/2c	

WEATHER STRIPS.	
Metallic Stitched.	
1/2 in., per 100 ft.	\$1 30
3/4 in., per 100 ft.	2 20
Wood and Felt.	
1/2 in., per 100 ft.	\$1 55
3/4 in., per 100 ft.	1 55

WEIGHTS.	
Hitching	per lb. Nets
Sash—f. o. b. Chicago	
Smaller lots, per ton	\$47 50

WHEEL BARROWS.	
Common Wood Tray	\$3 75
Steel Tray, Competition	4 50
Steel leg, garden	6 00

WIRE.	
Plain annealed wire, No. 8	
per 100 lbs.	\$3 70
Galvanized barb wire, per	
100 lbs.	4 10
Wire cloth—black painted,	
12-mesh, per 100 sq. ft.	2 25
Cattle Wire—galvanized	
catch weight spool,	
per 100 lbs.	4 60
Galvanized Hog Wire, 80 rod	
spool, per spool.	3 95
Galvanized plain wire, No. 9,	
per 100 lbs.	4 15
Stove Pipe, per stone.	1 10

WOOD FACES.	
50% off list.	

WRENCHES.	
Coes Steel Handle, 6-in. 40-10%	
" " " 8-in. 40-10%	
" " " 10-in. 40-10%	
" " " 12-in. 40-10%	
Coes Knife-Handle, 6-in. 40-10%	
" " " 8-in. 40-10%	
" " " 10-in. 40-10%	
" " " 12-in. 40-10%	
Coes All Patterns	40-10%

WRINGERS.	
No. 790, Guarantee per doz.	\$49 50
No. 770, Bicycle	47 00
No. 670, Domestic	43 50
No. 110, Brighton	39 00
No. 750, Guarantee	51 00
No. 740, Bicycle	45 50
No. 32, Pioneer	35 50
No. 2, Superb	35 50

ADVERTISERS' INDEX

The dash (—) indicates that the advertisement does not appear in this issue.

A	
Aeolus Dickinson Co.	—
American Brass Co.	—
American Chain Co.	—
American Furnace Co.	6
American Rolling Mill Co.	39
American Steel & Wire Co.	43
American Stove Co.	—
Arex Company	43
Ashton Mfg. Co.	—
B	
Berger Bros. Co.	41
Bernz Co., Otto	45
Bertsch & Co.	43
Braden Mfg. Co.	41
Brillion Iron Works	—
Bullard & Gormley Co.	47
Burgess Soldering Furnace Co.	—
Burton Co., W. J.	—
C	
Callender Soldering Process Co. 50	
Chicago Elbow Machine Co.	—
Chicago Solder Co.	41
Clark & Co., Geo. M.	—
Clark-Smith Hardware Co.	43
Clayton & Lambert Mfg. Co.	45
Cleveland & Buffalo Transit	
Co.	51
Cleveland Castings Pattern Co. 10	
Coes Wrench Co.	51
Copper & Brass Research	
Association	—
Copper Clad Malleable Range	
Co.	—
Cornish & Co., J. B.	47
Cortright Metal Roofing Co.	41
D	
Dieckmann Co., Ferdinand	—
Diener Mfg. Co., Geo. W.	45
Double Blast Mfg. Co.	45
Dreis & Krump Mfg. Co.	43-45
Dunning Heating Supply Co.	—
E	
Ewert & Kutschied Mfg. Co.	—
F	
Fanner Mfg. Co.	—
Farquhar Furnace Co.	—
Federal Varnish Co.	—
Forest City Fdy. & Mfg. Co.	4
Fox Furnace Co.	—
Friedley-Voshardt Co.	43
Furnace Fan Corp.	Front Cover
G	
Geroch Bros. Mfg. Co.	41
Gehmann Bros. & Kahler	—
H	
Hall-Neal Furnace Co.	—
Harrington & King P'f'g Co.	41
Hart & Cooley Co.	—
Haynes-Langenberg Mfg. Co.	5
Heller Bros.	—
Henry Furnace & Fdy. Co.	—
Hessler Co., H. E.	—
Hess-Snyder Co.	9
Homer Furnace Co.	—
Hones, Inc., Chas. A.	—
Honeywell Heating Spec. Co.	3
Hussey & Co., C. G.	43
Hysfield Mfg. Co.	—
I	
Independent Register & Mfg.	
Co.	10
Indiana Stove Works	—
Inland Steel Co.	41
International Heater Co.	14
K	
Kant-Break Ladders, Inc.	—
Kirk-Latty Mfg. Co.	13
Kruse Co.	6
L	
Lalance & Grosjean Mfg. Co.	31
Lamneck & Co., W. E.	—
Lennox Furnace Co.	—
Lovell Mfg. Co.	—
Lupton's Sons, David	—
M	
Machine Appliance Corp.	—
Majestic Co.	—
Malleable Iron Range Co.	—
Maplewood Machinery Co.	—
Marshalltown Mfg. Co.	—
May-Flebeiger Co.	—
Melbye Bros. Co.	—
Merchant & Evans Co.	—
Meyer Furnace Co., The	—
Meyer Bros. Co., F.	5
Meyer Mfg. Co., Fred J.	50
Michigan Stove Co., The	—
Milwaukee Corr. Co.	Back Cover
Monroe Fdy. & Furnace Co.	—
Mt. Vernon Furn. & Mfg. Co.	9
N	
New Jersey Zinc Co., The	—
Northwestern Stove Repair Co. 13	
O	
Osborn Co., The J. M. & L. A. 43	
P	
Peck, H. E.	50
Q	
Quick Furnace & Supply Co.	—
Quincy Pattern Co.	10
Quick Meal Stove Co.	45
R	
Red Front Furnace & Supply	
Co.	—
Rock Island Register Co.	—
Roesch Enamel Range Co.	13
Ross-Gould	—
S	
Schwab & Sons Co., R. J.	—
Scheible-Moncrief Heater Co.	6
Spaulding Hotel	51
Special Chemicals Co.	45
Standard Furn. & Supply Co. 10	
Standard Ventilator Co.	43
Stearns Register Co.	11
St. Clair Foundry Co.	9
St. Louis Tech. Inst.	50
Stove Dealers Supply Co.	13
Success Heater & Mfg. Co.	—
Sullivan-Geiger Co.	10
T	
Taylor & Co., N. G.	—
Thatcher Furnace Co.	7
Tuttle & Bailey Mfg. Co.	11
U	
Utica Heater Co.	5
V	
Vaughan & Bushnell Mfg. Co.	—
Vedder Pattern Works	10
Viking Shear Co.	—
W	
Walworth Run Fdy. Co.	—
Waterloo Register Co.	9
Waterman-Waterbury Co.	4
Whitney Mfg. Co., W. A.	—
Whitney Metal Tool Co.	—
Wise Furnace Co.	—
Z	
Zarco Mfg. Co.	—
Zideck Auto Radiator School.	—